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ABSTRACT

In the principal article, "A Comparison of Two Large-Scale Studies of the Use-Effectiveness of IUDs," the results of evaluation of loop D use in 11 public health and hospital clinics (California Cooperative Statistical Program for Evaluation of Intrauterine Devices) are compared with results from the Cooperative Statistical Program for Evaluation of Intrauterine Devices. The second article, "Policies Affecting Population in West Africa," examines the overall impact of governmental social and economic development policies on the rate of population growth and the movement of people from rural to urban areas. "Family Planning Acceptors in Lagos, Nigeria," describes a comparative study of family planning clinic patients. Its purpose was to look for indications of the kinds of persons who might attend such clinics, given further health education and the opening of additional clinics. Three social and demographic factors emerged from this study as predictors of use of family planning: age, parity, and educational level. The final article, "Use of Oral Contraceptives in Urban, Rural, and Slum Areas," describes a comparative study of the acceptability and use-effectiveness of oral contraceptives in the Howrah District in India. (LK)

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A Comparison of Two Large-Scale Studies of the Use- Effectiveness of IUDs

by A. PIERCE, J. M. HILLER, and J. MCGUIRE

The results of the California Cooperative Statistical Program for Evaluation of Intrauterine Devices and the Cooperative Statistical Program for Evaluation of Intrauterine Devices are compared with respect to such elements as demographic characteristics of acceptors, continuation rates, percents lost to follow-up, and annual and cumulative rates of events by type of termination over a two-year period. Although differences in definitions and procedures to some extent limited the comparability of the two studies, the California Program's close duplication of the results of the Cooperative Statistical Program was sufficient to confirm the general validity of the latter.

Mr. Pierce, Ph.D., is director, Mrs. Hiller, M.A., assistant director, and Mr. McGuire, Ph.D., senior statistician of the Family Planning Study of the School of Public Health of the University of California at Berkeley. The research upon which this publication is based was performed pursuant to Contract No. PH-43-67-1391 with the National Institutes of Health, Department of Health, Education, and Welfare, under the sponsorship of the National Institute of Child Health and Human Development.

In this report the results of evaluation of loop D use in 11 public health and hospital clinics (California Cooperative Statistical Program for Evaluation of Intrauterine Devices) are compared with results from the Cooperative Statistical Program for Evaluation of Intrauterine Devices directed by Christopher Tietze, M.D., and sponsored by the Population Council. Because of the similarity and length of the official names, the Tietze

study will be referred to henceforward as the CSP, and the California study, which has been known informally as the Family Planning Study, will be referred to as the FPS. Readers of this comparative report are assumed to be familiar with the results and methods of analysis presented in the CSP's Ninth Progress Report (1). Until now the CSP has been the principal source of information on the experience of varied categories of IUD acceptors of one

of the major first generation types of device.

Participating clinics in the FPS were based either in county hospitals (52.0 percent of all first insertions) or in public health departments (43.9 percent of all first insertions). A very small proportion of first insertions (4.1 percent) were performed in two private hospital clinics. Most of the participating clinics were unable to sustain the burden of scheduling follow-up more often than a month or two after insertion and annually thereafter.

Investigators participating in the CSP included, in addition to public hospital-based clinics, a number of specialists in obstetrics and/or gynecology in private or group practice or in Planned Parenthood or private hospital clinics. A good number of participating physicians were deeply involved in research on intrauterine contraception; at least two of them were engaged in design of several types of devices being studied. It is likely that, as Dr. Tietze suggested, they "took a greater interest in the individual woman than is usually possible in a public health setting." As an example of this, the general

TABLE OF CONTENTS

A Comparison of Two Large-Scale Studies of the Use-Effectiveness of IUDs A. Pierce, J. M. Hiller, and J. McGuire	205
Policies Affecting Population in West Africa Davidson R. Gwatkin	214
Family Planning Acceptors in Lagos, Nigeria Robert W. Morgan	221
Use of Oral Contraceptives in Urban, Rural, and Slum Areas Murari Majumdar, B. C. Mullick, A. Moitra, and K. T. Mosley	227

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205

Hobart Ellis

TO ERIC AND ORGANIZATIONS OPERATING
UNDER AGREEMENTS WITH THE U.S. OFFICE
OF EDUCATION. FURTHER REPRODUCTION
OUTSIDE THE ERIC SYSTEM REQUIRES PER-

TABLE 1. Comparison of CSP and FPS number and percent of first insertions by loop D, by age, parity, and interval from last pregnancy to insertion.

Item	Number of first insertions of Lippes loop D		Percent of first insertions of Lippes loop D	
	FPS	CSP	FPS	CSP
Age				
15-24	2,233	2,831	49.0	37.5
25-29	1,163	2,113	25.5	28.0
30-34	669	1,411	14.7	18.7
35-49	490	1,198	10.8	15.8
Total	4,555 ^b	7,553	100.0	100.0
Parity				
None	(9) ^a	134	(0.0) ^a	1.8
1-2	1,649	3,262	36.2	43.2
3-4	1,616	2,732	35.5	36.2
5+	1,290	1,425	28.3	18.8
Total	4,555 ^b	7,553	100.0	100.0
Interval from last pregnancy to insertion				
5-12 weeks	2,301	2,301	50.5	30.5
More than 12 weeks	2,256	5,252 ^c	49.5	69.5
Total	4,557 ^b	7,553	100.0	100.0

Note. Distribution of loop D acceptors in the CSP was taken from Table 2 in C. Tietze and S. Lewit, "Evaluation of Intrauterine Devices: Ninth Progress Report of the Cooperative Statistical Program," *Studies in Family Planning* 1, no. 55 (July 1970), p. 4.

^a Actually a few nulliparous acceptors received D loops, but 0 parity was defined out of the analytic population because there were too few cases on which to make reliable assessments of user experience.

^b The discrepancy between the totals results from two cases with parity unrecorded, which two cases are not included in the rates analyses that follow.

^c Or never pregnant.

pattern of follow-up examinations scheduled by the clinics in the CSP in the first year after insertion was at approximate intervals of three months (after first or second menses), at six months, nine months and 12 months (1, p. 6).

Characteristics of acceptors in the two populations also differ, predictably. In general, initial acceptors of loop D in the FPS were younger and of higher parity at first insertion than those in the CSP. Half of the FPS acceptors of loop D were inserted within three months of last pregnancy termination, compared with less than a third of the CSP acceptors. This implies that a much larger proportion of the CSP acceptors were motivated to seek contraception independently of a regularly scheduled "six weeks" postpartum checkup. That level of motivation might be expected to be accompanied by a greater tolerance of side effects and more persistent cooperation with research efforts. Table 1 compares the two populations of loop D acceptors.

Definitions and Procedures

Results of the two studies can only be compared where definitions and procedures are comparable. General types of terminating event or closure of IUD use employed by both the FPS and the CSP are: accidental pregnancy, expulsion, re-

moval for medical reasons, removal for personal reasons, lost to follow-up, and released from follow-up. Operational definitions of several of these types of termination differ between the two studies. Where differences are not mentioned, commonly shared definitions may be found in the CSP Ninth Progress Report (1, p. 6). Types of Termination for which FPS and CSP rates will be compared are:

Pregnancy (1)

Expulsion
First expulsion
Later expulsion

Removal (2)

Removal for pain and/or bleeding
Removal for other medical reasons (3)
Planning pregnancy
Other personal (4)

In addition, the following are discussed:

Loss to follow-up (5)

Release from follow-up (6)

Parenthetical numbers refer to notes comparing operational definitions used in the two studies. These notes appear here-with in numerical order.

(1) For about 37 percent of all accidental pregnancies recorded in the FPS, the status of the device at time of conception is not known. These involve occurrence of both a conception and either an expulsion, a removal, or a uterine per-

foration, and either the date of the associated termination and the estimated date of conception were so close that we cannot be certain which occurred first, or one or both dates had to be approximated. For the sake of scientific conservatism all these pregnancies were charged to device failure. The single exception to this rule was when the associated removal was for the purpose of becoming pregnant and the estimated conception date was immediately after the removal date. Such terminations were classified as "removal, planning pregnancy." The CSP followed the same practice.

Conceptions occurring prior to insertion were excluded from the FPS analytic population but classified as removals by the CSP. Conceptions known to have occurred after another type of termination were not, of course, classified as terminations by either study.

(2) When two or more reasons for removal were given, the FPS classified the removal by the reason or combination of reasons that appeared first on the following priority list: pain and/or bleeding; other medical; planning pregnancy; personal other than planning pregnancy; other reasons (believed to be nonrelevant to device effectiveness); reason unknown. The CSP also gave priority to medical reasons over personal reasons for removal.

(3) "Other medical" reasons for removal for the two studies are listed below:

"Other medical" reasons for removal

Hysterectomy (completed)

PID or salpingitis

Definite or possible cancer, atypical PAP, or for biopsy

Discharge

Other genital tract pathology (cervicitis, vaginitis, and so on)

D & C or other surgery

Endometritis

Complaints of menstrual irregularity, menstrual problems other than pain/bleeding attributed to device

Discomfort of husband

Retracted threads

Anemia

Ovarian cysts

Perforation of uterus or cervix

Discomfort of user (not pain/bleeding)

Accidental removal by user

Cystocele, rectocele

Insertion into pregnant uterus (Excluded from FPS)

Erroneous diagnosis of pregnancy

(4) Personal reasons for removal are handled somewhat differently by the two studies. These removals are for "planning pregnancy" and for "other personal reasons" (shown separately by both studies), and for "other reasons" (originally termed "nonrelevant reasons" and including removals for which no reason was given). Removals for "planning pregnancy" are likely to be coded fairly consistently between the two studies; those for "other personal reasons" and "other reasons" are not. Reasons classified as "other personal" in one or both studies are listed on the right.

Selected reasons (OR) were screened out of the "other personal" classification in the FPS analysis on the grounds that classification as defined also represents unsuccessful use of intrauterine contraceptives, whether due to psychological pressures or to a preference by the patient or her husband for some other contraceptive method or for no method. Although the distinction between personal reasons relevant to device-effectiveness and those nonrelevant may be useful, there was not a sufficient number of these removals in the FPS to permit reliable analysis. "Other personal" and "other" reasons for removal were calculated only for comparison with the CSP. There is doubt as to whether they should have been separated, since in their present form, neither the rate of removals for "other personal" reasons nor the sum of the two categories in the FPS is fully comparable to the rate of removals for "other personal" reasons in the CSP because removal at investigator's choice, classified by the FPS with "other" reasons for removal (OR), is excluded from all rates presented by the CSP. Fortunately this category is very small.

(5) Loss to follow-up is defined by both studies as covering those women overdue by at least three months for a scheduled clinic follow-up "from whom no information could be obtained by telephone, mail, or home visit" (1, p. 6) and in addition,

"Other personal" (OP) reasons for removal

	Classification ^a CSP	FPS
Lack of confidence in device	OP	OP
Fear of injury (or cancer or disease)	OP	OP
Religious reasons	OP	OP
Husband's objection	OP	OP
Elective sterilization of husband or wife	OP	OP
Outside doctor's advice	OP	OP
No reason given	OP	OR
Patient requests pills or other contraceptive method	OP	OP
Separation, divorce, widowhood	OP	OR
Patient no longer wants or needs birth control, including planned marriage with no mention of desired pregnancy	OP	OR
Accidental removal by patient, other nonmedical person or by doctor after accidentally cutting threads too short	OM	OR
Routine removal after extended use or nonstudy clinic or PMD policy on type or size of device	} Removal at investigator's choice	OR
Patient moving from area		

^a OP = other personal reasons; OR = other reasons; OM is a medical reason other than pain/bleeding.

in the FPS those about whose IUD status no information could be obtained from hospital records.

Loss to follow-up enters into the calculation of other rates by reduction of the number at risk subsequent to its occurrence. Numbers and annual and cumulative percents of acceptors becoming lost to follow-up are shown in Table 2 for loop D, all segments, for the FPS.

Levels of loss to follow-up are generally higher for FPS participating clinics than in the population of acceptors in the CSP. In the FPS, staff tracing efforts were concentrated on acceptors who had been lost to follow-up in the first segment within their first year of experience. The efforts were thus allocated because of the emphasis of the FPS on correlates of IUD effectiveness and the anticipation that the events of primary interest would be manifest sufficiently in the first year. As it happened, some 60 percent of the first segment pregnancies, 81 percent of the expulsions, and 51 percent of the removals for a four-year period of observation occurred within the first year. It is also true that efforts at long term follow-up in public health clinics entail a risk of introducing bias through association between successful tracing and characteristics affecting outcome. FPS staff made no comparably intensive effort to trace ac-

ceptors of reinsertion or terminated acceptors or women with a year or more of uninterrupted IUD use. Efforts of participating clinics to trace patients lost to follow-up varied greatly over time and between clinics but were unrelated to patients' experience with the IUD.

Tietze has analyzed the first year's (all segments) experience with loop D for a group of ten of the CSP investigators with good follow-up (averaging 3.3 percent lost to follow-up) and a second group of ten investigators with poor follow-up (averaging 13.1 percent lost to follow-up) (2).^{*} The only significant difference he found between the two groups at one year was in rates of removal for bleeding and/or pain. In a similar investigation using loop D first segments, FPS found that three groups of clinics, defined by range of percent lost to follow-up at the end of one year (5.5-7.9, 8.8-9.1, and 10.6-15.1), differed in rates of removal both for pain and/or bleeding and other (personal) reasons. One would expect that clinic practices, resources, and circumstances would affect both the levels of voluntary removal and return for follow-up. For example, where clinic staff is inadequate to the task of contacting patients overdue for a follow-up visit, it seems likely that pressures on staff resources would also inhibit the greater investment of time in supportive therapy for such side effects of IUD use as pain or bleeding, and thus increase the likelihood that complaints would be handled by removal. This was not tested directly, however; no informa-

TABLE 2. Numbers and annual cumulative percents of acceptors lost to follow-up for loop D, all segments, for the FPS.

Ordinal year after first insertion	Number becoming lost to follow-up in given year	Percent of women continuing at beginning of given year and becoming lost to follow-up in that year	Cumulative percent becoming lost to follow-up by the end of specified year after first insertion	
			All insertions	First insertions
First	435	9.6	9.6	9.0
Second	355	12.1	17.3	16.2
Third	376	20.8	25.6	23.3
Fourth	338	41.6	33.0	29.7

^{*} Our own analysis suggests that the effects of follow-up loss would vary considerably with more detailed breakdowns of the data, and we would not regard it as safe to generalize Tietze's findings on this point beyond the population on which it was based. A detailed analysis of the effects of follow-up loss is in an early stage of preparation.

tion was collected on complaints independently of termination by removal. FPS data do not support the finding that device-dependent clinic differences in bleeding and/or pain removals, as reported by Bernard from Pathfinder Fund Studies (3), are independent of completeness of follow-up; the risks of becoming lost to follow-up and terminating device use are not independent of one another. To the extent that becoming lost to follow-up is associated with characteristics that are in turn associated with selected types of terminations, the rates of removal for pain and/or bleeding and the other types of termination are suspect.

(6) Release from follow-up with device in place includes for both studies the few deaths (from causes known to be unrelated to device use) and all acceptors withdrawn from observation with device known or believed to be in place. Referral to other clinics or physicians is included in this classification by the CSP, but it was not feasible in the FPS to keep track of these referrals, which therefore often were classified as lost unless subsequently contacted. It is assumed that acceptors are released from follow-up independently of their experience with the IUD or characteristics related to experience, and that their being withdrawn from the population at risk does not introduce any systematic bias.

Neither study presents rates of closure due to release from follow-up (or removal at investigator's choice in the CSP).

Dates for each type of termination are determined by similar methods in the two studies. Conception date is estimated as two weeks after onset of the last menstrual period. For both removal and noticed expulsion, dates of occurrence were recorded; unnoticed expulsion is usually considered to have occurred midway between the last date the device was known or believed to be in place and the first date it was missed. Date of loss to follow-up is recorded as date of last contact.

Release from follow-up implies that the device is known or believed to be in place at the time of release. It was dated by the FPS, in contrast to the CSP operational definition, as of clinic cut-off for acceptors who were overdue at that time and who came into the clinic later or were successfully traced. For those who were not overdue on the date of clinic cut-off, the FPS date of release from follow-up was the date of the first completed follow-up visit at which the date assigned for the

next scheduled visit fell after clinic cut-off of data collection. In no case did FPS include experience beyond date of last contact; whereas CSP included as protected days those between last contact and clinic cut-off except in the case of acceptors overdue three or more months for a scheduled follow-up.

Unlike the CSP (4), the FPS retained in the study women reinserted in other than participating clinics (if in the process of tracing we discovered a woman with an apparently continuing segment and the tracing history revealed that there had been an intervening termination and subsequent reinsertion) until they terminated or became lost to follow-up. This practice seemed reasonable, since study staff had to trace women overdue by three or more months for a scheduled clinic follow-up anyway, and the tracing interview frequently was a source of information about such terminations and subsequent reinsertions and the months of protection by the new device. CSP practice was to record the preceding termination as an event, record the reinsertion, and close the case in the first month (that is, with one-half month of use).

Comparisons of Rates

Comparisons of rates obtained in the two studies are presented in the next five tables (Tables 3 thru 7). The analytic population in all cases is described as parous acceptors of loop D, ages 15-49, first inserted 31 or more days after last pregnancy; however, a small number of nulliparous women (1.8 percent) is included in the CSP population in Tables 3-5. The first three tables present both competing risk (net) and single risk (gross) rates covering two years of observation of the cohort. The differences in the types of information presented in each table may be discerned in the following:

Competing risk (net) and single risk (gross) rates

Table 3 first segments	} Terminations	} Annual and cumulative (two-year)
Table 4 all segments		
Table 5 all segments		

Competing risk (net) only

Table 6	All segments,	One-year, controlled for parity within age
Table 7	terminations	Two-year cumulative, controlled for parity

Although rate comparisons could have been presented for at least four years, the deterioration in follow-up completeness after the second year in the FPS elevated the hazard of serious bias from that source to an unacceptably high level.

Tables of event specific counts have been omitted in order to conserve space.

However, a rough idea of the numbers involved may be inferred from the average numbers at risk at the bottom of the columns. Life table methods of computing the rates preclude reconstruction of the numbers of events by simple methods. In any case the inclusion of confidence intervals relieves the reader of the necessity to assess the reliability of rates in the two studies. For any corresponding pair, the FPS rate is regarded as significantly different from the CSP rate if their confidence intervals are disjoint, that is, if they do not contain common values or "overlap".* The FPS rate is underlined in the tables wherever a significant difference occurs. In fact, there are remarkably few significant differences in the comparable findings of the two studies.

Under ideal circumstances the CSP and FPS studies would have been jointly planned with an eye to comparability. Since they were not, the choices of comparisons to be made were severely restricted by considerations of such comparability. Thus a number of obviously interesting comparisons that might otherwise have been made, were not.

Interpretation of Data

Inspection of Tables 3 thru 7 indicates that, differences in operational procedures and composition notwithstanding, there are no significant differences in pregnancy rates between the two studies for the observation periods indicated, whether one be speaking of annual or cumulative, competing or single risk rates and whether one be speaking of first segments or all segments for either terminations or closures.

Virtually the same observation can be made for first expulsions except for "all segment terminations" as displayed in Table 4 where the FPS rates are significantly lower for competing and single risk

* A less stringent definition of difference would have designated two rates as different if neither fell within the confidence interval of the other. Since confidence intervals are presented, anyone may satisfy himself as to what effects this alternative definition would have. Ideally two-sample tests using the data from both studies would have been used to define significant differences, but this would have been time-consuming all out of proportion to its advantage.

TABLE 3. Comparison of CSP and FPS annual and cumulative rates of events per 100 users, by type of termination: loop D, first segments, two years of observation, parous acceptors ages 15-49 first inserted 31 or more days after last pregnancy.

Events	Study	Competing risk (net)			Single risk (gross)		
		Annual		Cumulative (2 years)	Annual		Cumulative (2 years)
		1st year	2nd year		1st year	2nd year	
Pregnancies	CSP	2.4 (2.0- 2.8) ^a	1.9 (1.4- 2.3)	3.8 (3.3- 4.2)	2.9 (2.5- 3.4) ^a	2.0 (1.5- 2.5)	4.9 (4.3- 5.5)
	FPS	2.5 (2.1- 2.9)	1.9 (1.4- 2.4)	3.8 (3.3- 4.3)	3.0 (2.6- 3.5)	2.1 (1.6- 2.7)	5.0 (4.4- 5.7)
Expulsions	CSP	9.1 (8.4- 9.8)	2.3 (1.8- 2.8)	10.8 (10.0-11.5)	9.9 (9.1-10.6)	2.5 (1.9- 3.0)	12.1 (11.3-13.0)
	FPS	8.0 (7.3- 2.7)	2.1 (1.7- 2.7)	9.5 (8.8-10.3)	8.8 (8.0- 9.5)	2.4 (1.9- 3.0)	11.0 (10.1-11.8)
Removals Bleeding/pain	CSP	10.9 (10.2-11.7)	7.4 (6.5- 8.2)	16.2 (15.3-17.1)	12.1 (11.3-12.9)	7.8 (6.9- 8.8)	19.0 (17.9-20.1)
	FPS	12.9 ^b (12.1-13.8)	8.8 (7.9- 9.7)	19.0 (18.0-20.0)	14.5 ^b (13.6-15.5)	9.4 (8.4-10.4)	22.5 (21.4-23.7)
Other medical	CSP	3.1 (2.6- 3.5)	2.6 (2.1- 3.1)	4.9 (4.4- 5.5)	3.5 (3.1- 4.0)	2.8 (2.2- 3.4)	6.2 (5.6- 6.9)
	FPS	4.9 (4.4- 5.5)	4.6 (3.9- 5.3)	8.1 (7.4- 8.8)	5.8 (5.2- 6.5)	5.1 (4.4- 6.0)	10.6 (9.7-11.6)
Planning pregnancy	CSP	0.9 (0.7- 1.1)	1.9 (1.6- 2.3)	2.3 (2.0- 2.6)	1.1 (0.8- 1.4)	2.1 (1.8- 2.5)	3.2 (2.8- 3.7)
	FPS	0.7 (0.5- 1.0)	3.3 (2.7- 3.9)	3.0 (2.5- 3.5)	0.9 (0.7- 1.3)	3.7 (3.0-4.4)	4.6 (3.9- 5.3)
Other personal	CSP	2.1 (1.7- 2.4)	2.4 (1.9- 2.9)	3.8 (3.3- 4.3)	2.5 (2.1- 2.9)	2.6 (2.0- 3.1)	5.0 (4.4- 5.7)
	FPS	1.4 (1.1- 1.7)	1.8 (1.3- 2.1)	2.5 (2.1- 3.0)	1.7 (1.3- 2.1)	1.9 (1.4- 2.4)	3.5 (3.0- 4.1)
Other ^c	FPS	0.6 (0.4- 0.9)	1.4 (1.1- 1.9)	1.6 (1.3- 2.0)	0.8 (0.5- 1.1)	1.7 (1.3- 2.2)	2.4 (2.0- 3.0)
No events	CSP	71.5 (70.4-72.6)	81.5 (80.4-82.8)	58.2 (57.1-59.6)			
	FPS	68.9 (67.7-70.1)	76.4 (74.9-77.7)	52.6 (51.3-53.9)			
Average number at risk	CSP	5,565	3,202	4,383			
	FPS	3,448	2,178	2,812			

Note: CSP rates from Table 7, page 10, in C. Tietze and S. Lewit, "Evaluation of Intrauterine Devices: Ninth Progress Report of the Co-operative Statistical Program," *Studies in Family Planning*, No. 55 (July 1970). Confidence intervals were calculated by Dr. Tietze's staff for this comparison.

^a Parenthetical figures are the 95 percent confidence limits.

^b Underlined FPS rates are significantly different from the corresponding CSP rates.

^c Rates of removal for other reasons (believed to be nonrelevant to device effectiveness) are calculated separately in FPS but are pooled with other personal reasons (fear of injury, etc.) by the CSP.

first expulsion rates in the first annual and two-year cumulative categories. With one minor exception these differences do not test as significant when simultaneously controlled for age and parity for a one-year period, as presented in Table 6. However, this loss of significance could be due to the longer confidence intervals occasioned by the thinner data when controls are introduced.*

Later expulsions show significant differences for the second year annual termina-

* The perennial dilemma encountered in introducing controls is that one is never sure whether the vanishing of significant differences is owed to the effect of the control or to the diminished reliability of the rates and the consequently wider confidence intervals.

tion rates in Table 4 but these are not reflected in the corresponding two-year cumulative rates.

Removals for pain or bleeding show significant differences between the two studies for first year first segment annual and two-year cumulative termination rates (Table 3). For all segments however, these differences test as significant only for the single risk rates (Table 4). For closures, only the two-year cumulative single risk rates show significant differences between the two studies (Table 5). The significance of differences for first year competing risk all-segment terminations vanishes with simultaneous control of age and parity (Table 6). The same can be said for the

two-year cumulative rates when controlled for parity except for the parity 1-2 category, suggesting that whatever tendencies there are to differ are local to that category.

In the category, removals, other medical, the various rates are consistently significantly higher for the FPS than for the CSP in the absence of controls (Tables 3, 4, 5). With age and parity simultaneously controlled, the hypothesis of significant differences due to other factors is not supported for competing risk all-segment terminations (Table 6). For the two-year cumulative termination rates for all segments, controlled for parity, significant differences occur only in the parity 1-2

TABLE 4. Comparison of CSP and FPS annual and cumulative rates of events per 100 users, by type of termination: loop D, all segments, two years of observation, parous acceptors ages 15-49 first inserted 31 or more days after last pregnancy.

Events	Study	Competing risk (net)			Single risk (gross)		
		Annual		Cumulative (2 years)	Annual		Cumulative (2 years)
		1st year	2nd year		1st year	2nd year	
Pregnancies	CSP	2.7 (2.3- 3.1) ^a	2.0 (1.6-2.4)	4.2 (3.7- 4.7)	3.1 (2.6-3.5) ^a	2.1 (1.7- 2.6)	5.1 (4.5- 5.7)
	FPS	2.6 (2.2- 3.0)	2.0 (1.5-2.5)	3.9 (3.4- 4.4)	3.1 (2.7- 3.7)	2.2 (1.8- 2.8)	5.3 (4.7- 6.0)
Expulsions First	CSP	9.5 (8.8-10.2)	2.5 (1.9-3.1)	11.5 (10.7-12.2)	10.3 (9.6-11.1)	2.7 (2.2- 3.2)	12.9 (12.1-13.8)
	FPS	<u>7.8^b</u> (7.1- 8.5)	2.1 (1.7-2.6)	<u>9.2</u> (8.5- 9.9)	<u>8.6^b</u> (7.9- 9.4)	2.3 (1.9- 2.9)	<u>10.7</u> (9.9-11.6)
Later	CSP	3.2 (2.7- 3.6)	1.7 (1.3-2.1)	4.5 (2.0- 5.0)	3.6 (3.1- 4.1)	1.8 (1.4- 2.2)	5.4 (4.8- 6.0)
	FPS	3.1 (2.7- 3.5)	0.8 (0.6-1.2)	3.6 (3.2- 4.1)	3.7 (3.2- 4.2)	<u>0.9</u> (0.6- 1.3)	4.6 (4.0- 5.2)
Removals Bleeding/pain	CSP	11.7 (10.9-12.4)	7.6 (6.8-8.4)	17.5 (16.6-18.4)	12.4 (11.6-13.2)	7.9 (7.1- 8.7)	19.5 (18.4-20.5)
	FPS	12.8 (12.0-13.6)	8.9 (8.0-9.8)	18.7 (17.7-19.7)	<u>14.6</u> (13.7-15.6)	9.6 (8.6-10.6)	22.8 (21.6-24.0)
Other medical	CSP	3.5 (3.0- 3.9)	3.0 (2.5-3.5)	5.8 (5.2- 6.3)	3.9 (3.4- 4.4)	3.2 (2.6- 3.7)	6.9 (6.3- 7.6)
	FPS	<u>4.9</u> (4.4- 5.4)	4.5 (3.9-5.3)	<u>7.9</u> (7.2- 8.6)	<u>5.9</u> (5.2- 6.5)	5.1 (4.4- 5.9)	10.7 (9.8-11.6)
Planning pregnancy	CSP	0.9 (0.7- 1.2)	2.0 (1.6-2.4)	2.5 (2.1- 2.9)	1.1 (0.8- 1.4)	2.2 (1.7- 2.6)	3.3 (2.8- 3.8)
	FPS	0.7 (0.5- 0.9)	3.3 (2.7-3.9)	2.9 (2.5- 3.3)	0.9 (0.7- 1.3)	<u>3.7</u> (3.1- 4.4)	4.6 (3.9- 5.3)
Other Personal	CSP	2.2 (1.9- 2.6)	2.5 (2.0-2.9)	4.2 (3.7- 4.6)	2.6 (2.2- 3.0)	2.6 (2.1- 3.1)	5.1 (4.5- 5.8)
	FPS	<u>1.3</u> (1.1- 1.7)	1.6 (1.2-2.0)	<u>2.4</u> (2.0- 2.8)	<u>1.6</u> (1.3- 2.0)	1.8 (1.4- 2.3)	<u>3.4</u> (2.9- 4.0)
Other ^c	FPS	0.6 (0.4- 0.8)	1.4 (1.0-1.8)	1.5 (1.2- 1.8)	0.7 (0.5- 1.0)	1.6 (1.2- 2.1)	2.3 (1.9- 2.9)
Average number at risk	CSP	6,004	4,127	5,065			
	FPS	3,560	2,317	2,938			

Note: CSP rates from Table 5, page 9, in C. Tietze and S. Lewit, "Evaluation of Intrauterine Devices: Ninth Progress Report of the Co-operative Statistical Program," *Studies in Family Planning*, No. 55 (July 1970). Confidence intervals were calculated by Dr. Tietze's staff for this comparison.

^a Parenthetical figures are the 95 percent confidence limits.

^b Underlined FPS rates are significantly different from the corresponding CSP rates.

^c Rates of removal for other reasons (believed to be nonrelevant to device effectiveness) are calculated separately in FPS but are pooled with other personal reasons (fear of injury, etc.) by the CSP.

category for both the competing risk and single risk cases (Table 7).

For removals, planning pregnancy we find significantly higher FPS rates for the uncontrolled cases for second-year annual competing and single risk rates and for two-year cumulative single risk rates for both first segment and all segment terminations and for all segment closures (Tables 3, 4, 5). Again significant differences vanish for first-year all-segment competing risk terminations when age and parity are simultaneously controlled (Table 6). Significant differences also vanish for both competing and single risk two-year cumulative termination rates with parity controlled. It would seem reasonable, in this case at least, to conclude

that the control variables would account for the differences observed in the uncontrolled cases.

For removals, other personal we find significantly lower FPS two-year cumulative competing risk rates for both first segment and all-segment terminations and for all-segment closures. The same is true for the single risk termination rates, but there are no significant differences in the single risk closure rates (Tables 3, 4, 5). Again all the differences vanish in the controlled cases presented in Tables 6 and 7, and it seems reasonable to suppose that age and parity could account for the differences in the uncontrolled cases.

No comparison can be made for removals for other reasons because these

cases were included in other personal reasons in the CSP.

The available information indicates higher "success" rates for CSP than for FPS. The rates for the category no events in Table 3 indicate significantly fewer first segment terminations for CSP for the first and second year annual and two-year cumulative cases. A higher degree of successful use of the IUD is also indicated for the CSP population by their significantly higher annual and two-year cumulative continuation rates. Continuation rates are lower in the FPS than in the CSP, in part at least because of the different assumptions made and procedures followed regarding experience of the user between the last follow-up at which the device was

TABLE 5. Comparison of CSP and FPS annual and cumulative rates of closures per 100 users, by type of termination: loop D, all segments, two years of observation, parous acceptors ages 15-49 first inserted 31 or more days after last pregnancy.

Closures	Study	Competing risk (net)			Single risk (gross)		
		Annual	Cumulative	Annual	Cumulative	Annual	Cumulative
		1st year	2nd year	(2 years)	1st year	2nd year	(2 years)
Pregnancies	CSP	2.4 (2.0- 2.7) ^a	1.6 (1.2-1.9)	3.6 (3.1- 4.1)	2.7 (2.3- 3.1) ^a	1.7 (1.3-2.1)	4.3 (3.8- 4.9)
	FPS	2.6 (2.2- 3.0)	1.8 (1.4-2.3)	3.9 (3.4- 4.4)	2.9 (2.5- 3.5)	2.0 (1.5-2.5)	4.8 (4.2- 5.5)
Expulsions	CSP	2.9 (2.5- 3.3)	0.9 (0.6-1.1)	3.6 (3.1- 4.0)	3.2 (2.7- 3.6)	0.9 (0.6-1.2)	4.1 (3.5- 4.6)
First	FPS	3.4 (3.0- 3.9)	1.1 (0.8-1.5)	4.2 (3.7- 4.8)	3.7 (3.2- 4.3)	1.2 (0.9-1.6)	4.9 (4.3- 5.5)
Later	CSP	1.9 (1.6- 2.2)	0.7 (0.4-0.9)	2.4 (2.0- 2.8)	2.2 (1.8- 2.5)	0.7 (0.4-1.0)	2.9 (2.4- 3.3)
	FPS	1.7 (1.4- 2.1)	0.3 (0.1-0.5)	1.9 (1.6- 2.3)	2.0 (1.6- 2.4)	0.3 (0.2-0.6)	2.3 (1.9- 2.7)
Removals	CSP	10.4 (9.6-11.1)	6.3 (5.6-7.1)	15.3 (14.4-16.2)	11.0 (10.3-11.8)	6.6 (5.9-7.4)	16.9 (16.0-17.9)
Bleeding/pain	FPS	11.4 (10.6-12.2)	7.5 (6.7-8.4)	17.0 (16.0-18.0)	12.4 (11.5-13.3)	7.9 (7.1-8.9)	19.3 ^b (18.3-20.5)
Other medical	CSP	2.5 (2.1- 2.8)	2.2 (1.8-2.6)	4.2 (3.7- 4.7)	2.8 (2.3- 3.2)	2.4 (1.9-2.8)	5.0 (4.4- 5.6)
	FPS	4.0 (3.5- 4.5)	3.7 (3.2-4.4)	6.8 (6.1- 7.5)	4.5 (4.0- 5.1)	4.1 (3.5-4.9)	8.5 (7.7- 9.3)
Planning pregnancy	CSP	0.6 (0.4- 0.8)	1.5 (1.2-1.9)	1.8 (1.5- 2.2)	0.7 (0.5- 1.0)	1.7 (1.3-2.0)	2.4 (1.9- 2.8)
	FPS	0.6 (0.5- 0.9)	2.6 (2.2-3.2)	2.6 (2.2- 3.1)	0.8 (0.6- 1.1)	2.9 (2.4-3.5)	3.7 (3.1- 4.3)
Other personal	CSP	1.9 (1.6- 2.3)	2.1 (1.6-2.5)	3.5 (3.1- 4.0)	2.2 (1.8- 2.6)	2.2 (1.8-2.7)	4.4 (3.8- 4.9)
	FPS	1.4 (1.2- 1.8)	1.5 (1.2-2.0)	2.6 (2.2- 3.0)	1.6 (1.3- 2.0)	1.7 (1.3-2.2)	3.3 (2.8- 3.9)
Other^c	FPS	0.5 (0.3- 0.7)	0.7 (0.4-1.0)	1.0 (0.7- 1.3)	0.5 (0.4- 0.8)	0.8 (0.5-1.2)	1.3 (1.0- 1.7)
Continuation	CSP	77.4 (76.4-78.4)	84.7 (83.7-85.9)	65.6 (64.5-66.8)			
	FPS	74.4 (73.3-75.5)	80.7 (79.4-82.0)	60.0 (58.7-61.3)			
Average number at risk	CSP	6,004	4,127	5,065			
	FPS	3,560	2,317	2,938			

Note: CSP rates from Table 5, page 9, in C. Tietze and S. Lewit, "Evaluation of Intrauterine Devices: Ninth Progress Report of the Co-operative Statistical Program," *Studies in Family Planning*, No. 55 (July 1970). Confidence intervals were calculated by Dr. Tietze's staff for this comparison.

^a Parenthetical figures are the 95 percent confidence limits.

^b Underlined FPS rates are significantly different from the corresponding CSP rates.

^c Rates of removal for other reasons (believed to be nonrelevant to device effectiveness) are calculated separately in FPS but are pooled with other personal reasons (fear of injury, etc.) by the CSP.

verified as in place and the cut-off date of the study. The CSP includes that experience as continued protection; the FPS excludes all of it. As M.-Francoise Hall has indicated, the former method overestimates the true rate of continuation, whereas the latter method underestimates it (5).^{*} FPS one-year all segments con-

^{*} In a personal communication Dr. Tietze states: "In my opinion, the underestimation described here is counterbalanced at least partially, by wiping out the experience of all cases lost to follow-up to the last contact. In any event, the effect of this difference in procedure is smallest in the first year of use and increases with duration.

tinuation rates are higher than other rates based on the same approach of excluding experience between last visit and cut-off—74 percent compared with 63 percent in the Baltimore study. The higher parity of FPS acceptors may account for that difference.

All things considered the FPS findings would appear to justify reinforced confidence in the CSP findings. Even where statistically significant differences are observed, the relative magnitudes of the various categories of termination exhibit highly similar patterns. Moreover even

without controls the number of cases in which no significant rate differences are observed is quite impressive. Finally where the age and parity controls have been employed significant differences are quite rare. In Table 6 for instance, where age and parity are simultaneously controlled, only the single subcategory "first expulsions, ages 15-24, parity 3-4" shows a significant difference between the two studies. In Table 7 only parity is controlled, but even there, only ten cells out of a possible 48, or about 20 percent show significant differences.

TABLE 6. Comparison of CSP and FPS competing risk (net) cumulative rates of events per 100 users by type of termination, by parity within age: loop D, all segments, one year of observation.

Type of termination	Study	15-24 Years			25-29 Years			30-34 Years			35-49 Years		
		Parity 1-2	Parity 3-4	Parity 5+	Parity 1-2	Parity 3-4	Parity 5+	Parity 1-2	Parity 3-4	Parity 5+	Parity 1-2	Parity 3-4	Parity 5+
Pregnancies	CSP	3.8 (2.8-4.8) ^a	3.1 (1.8-4.3)	6.0 (2.4-12.3)	2.8 (1.5-4.0)	2.7 (1.6-3.8)	3.7 (1.8-5.6)	1.4 (0.4-3.1)	2.2 (0.9-3.5)	1.4 (0.5-3.0)	0.6 (0.1-2.1)	0.9 (0.2-2.5)	1.9 (0.8-3.9)
	FPS	3.0 (2.3-3.9)	2.5 (1.6-3.7)	2.1 (0.7-5.5)	1.6 (0.5-4.2)	3.3 (2.2-5.0)	2.9 (1.7-4.8)	—	3.4 (1.7-6.4)	2.3 (1.3-4.1)	—	0.8 (0.1-4.0)	0.9 (0.3-2.5)
Expulsions First	CSP	16.3 (14.5-18.2)	13.2 (10.8-15.5)	10.5 (5.0-16.0)	10.5 (8.1-12.8)	7.5 (5.7-9.3)	5.1 (2.9-7.3)	6.1 (3.7-8.6)	5.3 (3.3-7.3)	5.4 (3.2-7.5)	4.6 (2.4-6.9)	3.6 (1.7-5.5)	4.3 (2.2-6.3)
	FPS	13.0 (11.6-14.7)	8.2 ^b (6.6-10.1)	7.1 (4.0-11.8)	6.2 (3.7-9.9)	4.3 (2.9-6.1)	5.4 (3.7-7.7)	—	4.3 (2.4-7.5)	4.3 (2.8-6.5)	—	4.9 (2.3-9.5)	4.9 (3.2-7.4)
Later	CSP	5.9 (4.7-7.1)	4.6 (3.1-6.2)	1.7 (0.2-6.1)	2.7 (1.4-4.0)	3.1 (1.9-4.3)	2.7 (1.1-4.4)	2.5 (1.1-4.6)	1.0 (0.3-2.3)	2.3 (1.1-4.3)	0.0 (0.0-1.1)	0.8 (0.2-2.3)	0.3 (0.0-1.5)
	FPS	5.1 (4.2-6.3)	3.3 (2.3-4.7)	4.9 (2.5-9.2)	2.6 (1.1-5.5)	2.9 (1.8-4.5)	1.5 (0.7-2.9)	—	0.5 (0.0-2.4)	1.8 (0.9-3.5)	—	1.6 (0.3-5.2)	0.6 (0.1-2.0)
Removals Bleeding/pain	CSP	13.9 (12.2-15.6)	9.7 (7.6-11.8)	7.5 (3.4-14.1)	13.2 (10.6-15.3)	11.8 (9.6-14.0)	8.4 (5.6-11.1)	13.2 (9.7-16.7)	11.6 (8.7-14.4)	8.6 (5.9-11.3)	13.6 (9.9-17.4)	10.7 (7.5-13.8)	6.8 (4.2-9.4)
	FPS	15.6 (14.0-17.3)	11.4 (9.6-13.6)	10.5 (6.8-15.8)	18.5 (14.2-23.7)	13.1 (10.8-15.9)	8.9 (6.8-11.6)	—	14.0 (10.3-18.6)	8.6 (6.4-11.3)	—	9.5 (5.8-15.1)	7.2 (5.1-10.0)
Other medical	CSP	4.0 (3.0-5.0)	3.9 (2.5-5.3)	3.2 (0.9-8.1)	3.7 (2.3-5.2)	3.3 (2.1-4.5)	3.5 (1.6-5.3)	2.4 (1.1-4.6)	2.0 (0.9-3.6)	4.1 (2.2-6.0)	4.2 (2.0-6.4)	2.6 (1.3-4.8)	2.4 (1.1-4.6)
	FPS	4.2 (3.4-5.3)	5.6 (4.3-7.2)	9.1 (5.6-14.2)	1.0 (0.2-3.4)	5.4 (3.9-7.4)	5.1 (3.5-7.3)	—	3.4 (1.7-6.4)	6.8 (4.9-9.3)	—	3.1 (1.2-7.3)	4.9 (3.2-7.4)
Planning pregnancy	CSP	2.0 (1.3-2.7)	0.8 (0.3-1.7)	0.0 (0.0-0.8)	1.7 (0.7-2.7)	0.6 (0.2-1.4)	0.3 (0.0-1.4)	1.1 (0.3-2.8)	0.0 (0.0-0.7)	0.5 (0.1-1.7)	0.3 (0.0-1.8)	0.3 (0.0-1.4)	0.0 (0.0-1.0)
	FPS	1.8 (1.3-2.5)	0.3 (0.1-0.9)	0.7 (0.0-3.5)	0.0 (0.0-2.2)	0.2 (0.0-1.0)	0.2 (0.0-1.3)	—	0.5 (0.0-2.5)	0.3 (0.0-1.3)	—	0.0 (0.0-3.2)	0.0 (0.0-1.2)
Other personal	CSP	2.6 (1.8-3.5)	1.8 (0.8-2.7)	4.3 (1.4-10.0)	2.4 (1.2-3.5)	3.1 (1.9-4.2)	2.5 (1.2-4.5)	1.3 (0.4-3.1)	1.2 (0.4-2.6)	3.0 (1.4-4.6)	1.2 (0.3-3.0)	1.6 (0.6-3.4)	1.7 (0.6-3.7)
	FPS	1.5 (1.0-2.2)	1.1 (0.6-2.0)	1.4 (0.3-4.6)	0.5 (0.0-2.7)	1.0 (0.4-2.1)	1.5 (0.7-2.9)	—	0.0 (0.0-2.0)	1.8 (0.9-3.4)	—	3.2 (1.2-7.4)	1.5 (0.7-3.3)
Other ^c	FPS	0.6 (0.1-1.1) ^d	0.5 (0.0-1.1) ^d	0.8 (0.0-2.6) ^d	0.6 (0.0-2.6)	0.6 (0.2-1.6)	0.9 (0.2-2.4)	0.0 (0.0-6.2)	1.4 (0.5-3.9)	0.5 (0.1-1.7)	2.8 (0.2-13.1)	1.6 (0.3-5.2)	0.3 (0.0-1.6)
	CSP	1,764	861	128	727	918	437	393	537	467	378	416	393
Average number at risk	FPS	1,345	746	142	200	532	431	68	214	387	36	124	330
	CSP	1,326	690	106	566	756	366	319	449	383	292	350	327
	FPS	968	587	113	155	421	348	54	172	322	28	109	233

Note: CSP rates were prepared simultaneously with [1] tabulations and sent to FPS for comparison (Letter of transmittal, 10/23/70). CSP confidence intervals were supplied by Dr. Tietze's staff for this comparison (6/71).

^a Indicates rate base (average number at risk in the first year of use) < 100.

^b Parenthetical figures are the 95 percent confidence limits.

^c Underlined FPS rates are significantly different from the corresponding CSP rates.

^d Rates of removal for other reasons (believed to be nonrelevant to device effectiveness) are calculated separately by FPS but are pooled with other personal reasons (fear of injury, etc.) by the CSP.

^d These three confidence intervals [the rates for which are the difference between total terminations and the sum of pregnancies, expulsions, and removals for pain/bleeding, other medical, planning pregnancy, and other personal reasons, since we omitted other removals from the special analysis for this age group] were calculated by hand using the estimation formula

$$SE = \sqrt{\frac{RT}{100T}}$$

and establishing the 95% upper and lower limits of the interval as $\pm 2SE$. See Tietze [1] for further discussion of the method.

TABLE 7. Comparison of CSP and FPS cumulative rates of events per 100 users by type of termination, by parity at first insertion: loop D, all segments, two years of observation, parous acceptors ages 15-49 first inserted 31 or more days after last pregnancy.

Events	Parity 1-2		Parity 3-4		Parity 5+	
	CSP	FPS	CSP	FPS	CSP	FPS
<i>Competing risk (net) rates</i>						
Pregnancies	4.6	3.8	4.1	3.8	3.8	4.0
Expulsions	(3.8- 5.4) ^a	(3.1- 4.7)	(3.2- 4.9)	(3.0- 4.7)	(2.7- 4.9)	(3.1- 5.1)
First	14.3	13.6	10.2	<u>7.3^b</u>	7.2	5.8
	(13.0-15.6)	(12.2-15.1)	(9.0-11.4)	(6.3- 8.5)	(5.8- 8.6)	(4.8- 7.0)
Later	5.7	5.2	4.3	3.1	2.4	2.2
	(4.8- 6.5)	(4.3- 6.2)	(3.4- 5.1)	(2.5- 4.0)	(1.5- 3.2)	(1.5- 3.0)
Removals						
Pain/bleeding	19.4	<u>23.1</u>	17.0	18.4	13.6	13.1
	(18.0-20.9)	(21.4-24.9)	(15.5-18.5)	(16.8-20.1)	(12.8-14.3)	(11.6-14.9)
Other medical	5.7	6.4	5.9	<u>8.3</u>	5.5	<u>9.3</u>
	(4.8- 6.6)	(5.4- 7.5)	(4.9- 6.9)	(7.2- 9.6)	(4.2- 6.8)	(8.0-10.8)
Planning pregnancy	4.7	5.9	1.1	1.4	0.3	0.8
	(3.9- 5.5)	(4.9- 7.0)	(0.7- 1.6)	(0.9- 2.0)	(0.1- 0.8)	(0.4- 1.4)
Other personal	4.4	<u>2.5</u>	3.9	<u>2.1</u>	4.3	2.5
	(3.6- 5.2)	(1.9- 3.3)	(3.1- 4.7)	(1.6- 2.9)	(3.1- 5.4)	(1.9- 3.4)
Other	—	1.4	—	1.6	—	1.5
		(0.9- 2.0)		(1.1- 2.3)		(0.9- 2.2)
<i>Single risk (gross) rates</i>						
Pregnancy	5.8	5.7	4.8	4.9	4.3	5.2
Expulsions	(4.8- 6.8) ^a	(4.6- 7.0)	(3.9- 5.8)	(4.0- 6.1)	(3.1- 5.6)	(4.1- 6.6)
First	16.4	16.7	11.2	8.5	7.9	6.5
	(14.9-17.9)	(15.0-18.5)	(9.9-12.6)	(7.3- 9.9)	(6.4- 9.5)	(5.4- 7.9)
Later	7.1	7.3	5.1	3.8	2.7	2.6
	(6.0- 8.2)	(6.1- 8.7)	(4.1- 6.1)	(3.0- 4.8)	(1.7- 3.7)	(1.9- 3.6)
Removals						
Pain/bleeding	22.1	30.0 ^b	18.6	22.0	14.7	15.4
	(20.4-23.7)	(27.9-32.3)	(17.0-20.3)	(20.1-24.0)	(12.6-16.8)	(13.6-17.3)
Other medical	7.1	10.0	7.0	10.9	6.2	11.2
	(6.0- 8.2)	(8.6-11.8)	(5.8- 8.1)	(9.4-12.5)	(4.8- 7.7)	(9.7-13.0)
Planning pregnancy	6.5	10.9	1.4	2.1	0.4	1.1
	(5.4- 7.6)	(9.2-12.8)	(0.9- 2.0)	(1.4- 3.0)	(0.1- 1.0)	(0.6- 1.9)
Other personal	5.8	4.0	4.7	3.0	4.9	3.2
	(4.8- 6.9)	(3.1- 5.3)	(3.7- 5.6)	(2.2- 4.0)	(3.6- 6.2)	(2.4- 4.4)
Other	—	2.6	—	2.4	—	2.0
		(1.8- 3.8)		(1.7- 3.4)		(1.3-3.0)
Average number at risk	2,052	954	1,915	1,068	1,038	916

Note: CSP rates from C. Tietze and S. Lewit, "Evaluation of Intrauterine Devices: Ninth Progress Report of the Cooperative Statistical Program," *Studies in Family Planning*, No. 55 (July 1970). CSP 95% confidence intervals were calculated by Dr. Tietze's staff for this comparison (8/71).

^a Parenthetical figures are the 95 percent confidence intervals.

^b Underlined FPS rates are significantly different from the corresponding CSP rates.

It can, then, be concluded that a reasonably approximate replication of the CSP study has confirmed its general validity.

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Policies Affecting Population in West Africa

by DAVIDSON R. GWATKIN

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In West Africa, the unintended consequences of general government development programs are far more important in influencing population growth and movement than are explicit government population policies. Very few of the region's 20 countries have expressed official concern about population, but all of them are actively promoting social and economic development. The overall impact of governmental development policies has been to increase greatly the rate of population growth and the movement of people from rural to urban areas. Governments that say or do nothing explicitly about population are, thus, far from neutral. Without realizing it they are the active promoters of increasing population growth and rural-urban migration.

GOVERNMENT POPULATION POLICIES

Policies on Growth

West African governments fall into three categories with regard to population policy: those concerned about population growth, those that have expressed little or no awareness of the issue, and those eager to have their populations grow more rapidly. The second of these three groups is by far the largest, constituting roughly three-quarters of the governments in West Africa.

FOR LESS RAPID GROWTH:

GHANA AND NIGERIA

The West African government most concerned with reducing its rate of population growth is Ghana. In March 1969 Ghana became the first country in West Africa to define an official population policy. In its policy paper (Ghana, 1969), the government expresses its concern with reducing growth:

The population of Ghana is the nation's most valuable resource. . . . The protection

and enhancement of its welfare is the Government's first responsibility. When that welfare is threatened, the Government must act. The welfare of the nation is now endangered by a subtle, almost imperceptible demographic change. . . . Unless birthrates can be brought down to parallel falling death rates, Ghana's population will climb at a rate dangerous to continuing prosperity, and the children of the next few generations will be born into a world where their very numbers may condemn them to life-long poverty (p. 3).

The policy statement begins with a description of Ghana's demographic situation and the causes of rapid population growth in the country and then examines the consequences of this growth for income, food supply, educational expansion, employment, health, and welfare. There follows a discussion of the feasibility of lowering population growth through use of modern contraceptive methods. One of the seven specific policies presented in the statement declares:

Recognizing the crucial importance of a wide understanding of the deleterious effects of unlimited population growth and of the means by which couples can safely and effectively control their fertility, the Government will encourage and itself undertake programs to provide information, advice, and assistance for couples wishing to space or limit their reproduction. These programs will be educational and persuasive, and not coercive (p. 20).

This proposal resulted in the establishment of an active, adequately-funded nationwide family planning program in 1970.

The statement also proposes steps beyond family planning:

Ways will be sought to encourage and promote wider productive and gainful employment for women; to increase the proportion of girls entering and completing school; to develop a wider range of non-domestic roles for women; and to examine the structure of Government prerequisites and benefits and if necessary change them in such ways as to minimize their pronatalist influences and maximize their antinatalist effects (p. 20).

This provision is especially applauded by those who believe that family planning programs alone are not sufficient to bring about a significant reduction in fertility and that strong social measures are also needed. However, to date, the government has not been as active in implementing this element of its policy as it has been in initiating the family planning program.

Although official concern with population growth was expressed much earlier in Nigeria than in Ghana, it remains more tentative there. Reference to the need for a population policy appeared as early as June 1966 in *Guideposts for the Second National Development Plan*, prepared by the Ministry of Economic Development. Title VII of that document, entitled "Population growth," tentatively placed the growth rate in Nigeria between 2.0 and 2.5 percent per year. It called for a demographic sample survey to provide more accurate information and declared, "There is a need to evolve a population policy (including spatial distribution) as an integral part of the national development effort" (Nigeria, 1966, p. 3).

Since then, increasing numbers of government leaders in Nigeria have publicly expressed concern about population growth and the need for family planning. Those issuing statements have included the Federal Government Commissioners of five ministries (those of Economic Development and Reconstruction, Agriculture and Natural Resources, Health, Information and Labour, and Education); two Federal Government Permanent Secretaries (those of Health, and of Economic Development and Reconstruction); the Military Governors of three out of 12 states (those of Lagos, Kano, and North-Central); and the Commissioners of Health and Social Welfare of five states (those of Lagos, Western, Mid-Western, Kwara, and North-Eastern) (*Annual Reports*, 1967, 1968, 1969). Although their statements express support for family planning, citing the additional benefits of maternal and child health care, family welfare, and the human right to determine the number of pregnancies, not all make specific reference to a possible relation between family planning and population growth.

State and local governments in Nigeria provide support for family planning—for example, through their cooperation with the private Family Planning Council of Nigeria. Several of these governments have allowed the council to operate family planning clinics in government facilities

whenever these are not otherwise in use. Many also allow government health personnel to work in the Family Planning Council clinics outside their regular hours, to participate in training courses, and, in some cases, to work full-time for the council.

In November 1970, the Nigerian Federal Government issued its official population policy as part of the second National Development Plan (1970-1974). The statement (Nigeria, 1970) begins by stressing the potentially controversial nature of a population policy in Nigeria. It then outlines briefly the country's demographic situation, notes the problems associated with rapid population growth, but also points to the Nigerian resources and development potential as factors offsetting these problems. It concludes:

The magnitude of the country's population problem is unlikely to be such that calls for emergency or panic action. . . . What seems appropriate in the present circumstances of Nigeria is for the Government to encourage the citizens to develop a balanced view of the opportunities for individual family planning on a voluntary basis, with a view to raising the quality of life in their offsprings. Facilities are to be designed to protect mothers, on a long-range basis, from repeated and unwanted pregnancies, as well as to enable parents to space their children for better feeding, clothing, and education . . . during the Plan period, the Government will pursue a qualitative population policy by integrating the various voluntary family planning schemes into the overall health and social welfare program of the country. . . . The Government will establish a National Population Council to implement this population policy and program, and to coordinate all external aid support for family planning activities throughout the country (pp. 77-78).

Thus Nigeria has committed itself to the provision of family planning services through existing health facilities. But the Nigerian policy statement clearly places much less emphasis on the need for reducing the rate of population growth than does that of Ghana.

THE UNCONCERNED WEST AFRICAN MAJORITY

Outside of Ghana and Nigeria, official concern about population growth is limited. In most countries a few individuals from the health fields are attempting to alert their governments to the value of family planning. At the same time, in many of these countries policy makers—particularly those associated with economic planning—are becoming aware of the lack of knowledge about population growth in their countries and are

seeking ways to obtain further information. But concerned individuals are still very much in the minority.

The prevailing attitudes can be best understood by briefly considering a few countries that are representative of the 15* in this category:

Dahomey. Dahomey's economic planners displayed what was probably the earliest official concern in West Africa with population growth in the 1961-1965 Economic Development Plan (Dahomey, 1961).

The Dahomean population is growing rapidly, at 2.65 percent per year. . . . It is doubling every 26 years. Half the population is massed in the South, in a coastal band representing 7 percent of the country's land area, which is heading toward a high density. The Departments of the South-East and the North-West find themselves grappling with formidable problems of local over-population. Forty-six percent of the population is less than 15 years of age, which renders more acute the problems of food, education, and employment (p. 175).

Although this analysis was not followed by action, individuals within the government remained concerned. This concern led to a government request that the Population Council send a mission to study the country's population situation in June 1969. The final mission report was submitted in the summer of 1970, but the government's reaction is not yet known. To date, the country has no population policy.

The Gambia. Interest in the size and growth of Gambia's population was spurred by the 1965 publication of the final 1963 census results. By 1968 medical interest in family planning had increased enough that a private family planning association was established with moral support from the government. Subsequent reports on The Gambia economy by the International Monetary Fund and by a British Ministry of Overseas Development expert stressed the potentially negative effect of population growth on the country's economic growth.

As a result of this concern, the government requested a Population Council mission to study the available data and recommend an appropriate government policy. This study was undertaken in the summer of 1969. Its final recommenda-

* That is, all countries not specifically named as favoring less or more rapid population growth. These unconcerned countries are: Central African Republic, Chad, Congo (Brazzaville), Dahomey, The Gambia, Guinea, Liberia, Mali, Mauritania, Niger, Senegal, Sierra Leone, Togo, Upper Volta, Zaïre.

tions were submitted to the government in June 1970, but as yet no decision on them has been taken.

Senegal. Several leaders have become concerned over the impact of rapid population growth and have planned a special fertility rate survey for 1970-1971 to obtain the necessary information for further consideration of the issue. In the meantime, the government has given informal but strong encouragement to the pioneering founders of the first family planning association in French-speaking Africa.

Sierra Leone. The government has remained neutral on the question of family planning. As Thomas Dow (1969) of the Population Council reports:

While the government maintains an official position of . . . neutrality with regard to family planning, it allows the Planned Parenthood Association to provide services in public as well as private facilities. . . . The effect of existing family planning activities is negligible. Whether this will continue to be the case will depend largely on the government's policy. If it maintains its present position of neutrality, this will effectively preclude any significant increase in family planning in Sierra Leone. Conversely, if it endorses and financially supports family planning, substantial progress might be possible in the near future. At the moment, there is no indication that such a change is in the offing (p. 4).

However, this neutrality is a new development for Sierra Leone. When John Caldwell of the Population Council conducted a 1965 survey of governmental population policy in Commonwealth Africa, Sierra Leone was distinctly pronatalist. It was the only country in West Africa expressing the belief that it would benefit from a much larger population and conveying the hope that the birth rate might rise (Caldwell, 1968a, pp. 369, 371).

Togo. There appears to be no official policy about population growth and the related question of family planning in Togo. Present indications are that the Togolese Council of Ministers has decided to remain neutral on the subject. Yet this should not be taken to mean that the government favors rapid population growth. David and Jeane Stillman (1969) of the American Friends Service Committee, who recently interviewed Togolese government officials, report that:

Those members of the government interviewed did not appear to believe that the country would benefit from a population much larger than at present, but were concerned rather with redistribution and improved living standards for those who already make up the populace. The government avoids the notion of seeking to fill up empty

lands with a population boom. . . . Although the rate of population growth is not presently a matter of alarm, government planners do feel that rapid growth could hinder attempts to raise living standards. Those thinking in terms of the educational realm are particularly cognizant of this (p. 8).

FOR MORE RAPID GROWTH

Cameroon. At the 1969 World Health Assembly in Boston, the Cameroon government representative spoke of the alarming population decrease in Central Africa because of high mortality, especially among infants. He expressed a keen interest in measures to combat sterility as a means of counteracting this. He also felt that an increase in population would aid the developing countries to reach their goals more quickly. More recently, other Cameroonian government spokesmen have said that no measures to slow growth of the present 6 million population are to be contemplated until a goal of 15 million is achieved. The government has adopted a variety of policies with pronatalist aspects for working women, including paid maternity leave, children's allowances, and time off during office hours for care of children. At the same time, the Cameroon government does not oppose the use of contraceptive methods when prescribed by a physician for the sake of the mother's health.

Gabon. Gabon has been concerned with increasing its birth rate for some time. The 1963-1965 Gabon Intermediate Development Plan predicted that the expansion of public health programs would promote an increase in the country's population growth rate, which was considered insufficient at that time (de Buttet, 1970). The 1966-1971 Gabon Development Plan predicted a shortage of manpower by the beginning of 1970 (*West Africa*, 1970, p. 925). According to a United Nations Economic Commission for Africa survey; "Gabon's aim is to maintain its present birth rate . . . at 35 per 1,000" (United Nations, 1969, p. 12). The government has recently passed a law that prohibits importation of contraceptives, has instituted severe fines and prison penalties for any violation of the law, and has called for the appointment of special inspectors for its enforcement (Pradervand, 1970, p. 17).

Such strong measures must be viewed in the context of Gabon's unique geographic and economic situation. Gabon has by far the highest per capita income in West Africa, estimated at approximately US\$400 per year in 1966. Its birth

rate is by far the lowest in the region. Coupled with a continuing high mortality rate, this birth rate produces an extraordinarily low population growth rate of about 1 percent per year. Gabon's average population density (around 2.3 per square kilometer) is also extremely low. The country's rich forest and mineral resources require a large labor force for their exploitation ("Gabon," 1970, pp. 349-352).

Ivory Coast. Recent visitors to the Ivory Coast report a similar but as yet formally unexpressed governmental interest in promoting population growth for economic reasons. The Ivory Coast's gross national product has been expanding steadily at a rate of 7 percent per year. This growth makes it the only country in West Africa able to finance a rapidly rising standard of living despite a population growth rate estimated at 2.3 percent. However, this economic boom is also attracting a large number of migrants from neighboring countries, and it is now estimated that as much as one-quarter of the population is of foreign origin. This has generated concern among government authorities about the inability of the labor force to continue to absorb immigrants and about the political problems a large foreign population might produce.

Policies on Migration

Among the nations of West Africa, the issue of migration has received somewhat more governmental attention than population growth. Concern has focused upon two types of migration—migration across international boundaries and internal rural-urban migration.

INTERNATIONAL MIGRATION

As John Caldwell reported in his survey of population policies of Commonwealth Africa (1968a):

In most countries, the oldest type of population policy has been that relating to the regulation of migration. Such regulation has had to be considered more in recent years, because many of what are now international borders were little more than internal boundaries in the extensive British and French empires. Furthermore, independent governments are much more likely to feel a prior responsibility for securing employment for their own nationals than a colonial government (p. 370).

This attitude is apparent in the present policy of the Ghana government, which, once again, has the most clearly articulated position of any West African country. The March 1969 population policy statement declared:

The Government will adopt policies and establish programmes to . . . reduce the scale and rate of immigration in the interest of national welfare . . . [because] uncontrolled immigration of labor, especially of the unskilled type, reduces employment opportunities for citizens. It is intended that immigration will be used primarily as a means of obtaining needed skills and stimulating social and economic development (p. 23).

On 18 November 1969, the government decreed that all aliens who did not obtain the required residence permit within two weeks would be expelled from the country. No complete official explanation for this action was given. Various unofficial explanations were: the desire to create more jobs for the increasing numbers of unemployed Ghanaians in the cities, concern over high crime rates reported among alien communities, a political tactic to gain prestige by appealing to latent hostility of citizens to outsiders, a desire to curb specific undesirable alien activities—such as domination of the retail sector by Syrians and Lebanese. Whatever the purpose, the result was a mad scramble by aliens to obtain residence permits and a dramatic exodus of thousands back to their native countries (particularly Upper Volta, Togo, Dahomey, and Nigeria) (*West Africa*, 1969 and conversations in Accra). Although there is no way to confirm the statistics, in January 1970 the government announced that approximately 200,000 of Ghana's 1,000,000 alien residents had left (*Daily Graphic*, 1970, p. 1). The continuing efforts by the police to apprehend noncomplying aliens leave no doubt about the government's determination to control immigration.

In other countries, governmental concern is more sporadic. Among the more noteworthy expressions of it have been:

- Expulsion of Dahomeans and Togolese from the Ivory Coast in 1958. As Akin Mabogunje of Ibadan University has reported, Dahomey supplied many areas of West Africa with professional as well as skilled manpower. As the movement toward independence gathered momentum, resentment grew. When a new influx of Dahomean and Togolese immigrants was rumored in October 1958, violence broke out in Abidjan, capital of the Ivory Coast. One man was killed, 50 injured, and much property damaged. As a result, more than 1,000 Togolese and Dahomean men and women left the Ivory Coast to return to their homes (Mabogunje, n.d., pp. 146-147).

- Expulsion of Dahomeans from Niger in 1963-1964. Again, Mabogunje reports "... in 1963, over a dispute with Dahomey, Niger suddenly ordered all Dahomeans living in its territory, estimated at about 16,000, to leave the country before the end of the year. Later, in 1964, it agreed to expel only Dahomean civil servants and not all Dahomeans, as had been threatened. . . ." (p. 147).

- Expulsion of Ghanaians from Sierra Leone. In December 1968, the Sierra Leone government ordered 2,000 Ghanaian fishermen to leave the country because they prevented Sierra Leoneans from fishing. The government also charged that the Ghanaians did not pay taxes and were a security problem in the event of attempted sea invasion (pp. 149-150).

The journal *West Africa* (1969) cites these and other cases in arguing that the November 1968 Ghanaian action was relatively mild:

Ghana is not expelling all aliens but only those without residence permits; permits will, no doubt, be readily issued to those in certain occupations such as mining. . . . The trend is clear. To a greater or lesser degree, it is the ambition of each of the governments . . . into which West Africa is divided, to reserve the right to live and work within its country for those who can pass a restrictive citizenship test.

Mabogunje has aptly summarized the situation: "Pan-Africanism appears everywhere to be on the retreat. It is being replaced by economic chauvinism which sees the contribution of the migrants not as resulting from their special circumstances but from an usurpation of the 'rights and privileges' of the members of the host community" (p. 14).

RURAL-URBAN MIGRATION

Many West African governments have adopted policies to curb rural-urban migration. But these policies have yet to be proven effective. Once more Ghana has expressed its views most clearly. The March 1969 government policy statement says:

The Government will adopt policies and establish programmes to guide and regulate the flow of internal migration, influence spatial distribution in the interest of development progress. . . . The Government intends to influence the flow of migration within the country so as to avoid excessive and uncontrolled concentration of population in urban areas. . . . It intends also to provide incentives for the siting of industries away from the major metropolitan areas; to urge industries in both private and public sectors

to decentralize some of their functions; to intensify its efforts to supply rural areas with facilities such as safe pipe-borne water and improved means of refuse disposal" (p. 22).

Programs to curb rural-urban population flows have been developed by governments in French-speaking West Africa.

In Zaïre (formerly Congo, Kinshasa),* an effort was made in 1967 to implement a "return to the land" policy through the establishment of a youth organization to develop agricultural communities. Major emphasis has also been placed on the establishment of new rural communities.

Senegalese efforts to stem rural-urban migration have focused on resettlement. The government seeks to open "new lands" in sparsely settled areas through the organization of communities supported by adequate infrastructure and capital investment. This "regional program" was described as a principal long-term objective of the Second Development Plan (1965-1969), designed in part "to prepare over the long run a more satisfactory regional equilibrium" and "to face the demands of demographic growth by increasing present production. . . ." (Senegal, n.d., p. 54).

Other West African governments have developed their own variations of the "return to the land" or "new lands" programs. The Upper Volta Plan Outline of 1967-1970 emphasized rural development as a way to stem potential rural-urban migration (Haute-Volta, n.d.). The Niger 1965-1968 Four-Year Plan expressed its concern at the rapid rate of urbanization, citing the expense to the government of providing for city-dwellers what rural people either go without or provide for themselves through collective action (Niger, n.d., p. 168). Internal population distribution and rural-urban population movements constitute the Togo Government's principal population interest (Stillman, 1969, p. 5).

Unfortunately, these policies are seldom implemented, and when they are, they rarely achieve the desired population redistribution or increase agricultural production. As the Congolese agricultural planners warned in correctly predicting the failure of the government's 1967-1968 "return to the land" program, urban consumers moved to rural areas tend to become rural consumers rather than producers (Congo, Kinshasa, 1966, p. 19).

* In references to publications from this area, we have kept the name of the country that appears on the publication.

GOVERNMENTAL DEVELOPMENT POLICIES AND THEIR UNINTENDED POPULATION EFFECTS

Although only a few West African governments have dealt directly with population issues, all of them have unintentionally influenced population growth and movement through policies directed toward other aspects of social and economic development. The most important of these policies are in the areas of health, education, family allowance, industrial location, and government revenue and expenditure allocation patterns between rural and urban areas.

Health

All West African governments are actively and effectively seeking to improve their citizens' health by establishing and supporting health programs. Table 1 gives available information on health expenditures of West African countries. No country listed devotes less than 7 percent of its recurrent budget to health. The average is close to 10 percent. The per-capita health expenditure ranges from US\$0.68 to \$4.40 with the average \$1.25-\$1.50. Many of these countries also provide additional capital investment funds for special health programs not included in the figures in Table 1.

These expenditures have produced results. The region-wide smallpox-measles program, for example, has given over 100 million smallpox vaccinations with the result that West and Central Africa recorded only 10 percent as many smallpox cases in 1969 as in 1968 (*Morning Post*, 1970, p. 12). The Government of Ghana estimates that life expectancy at birth has risen from 28 years in 1921 to 48 in 1965—a rate of nearly one-half year per year over the past 20 years. (Ghana, 1969, p. 6). The mortality level in Nigeria is estimated to have fallen by one-sixth from 29 per 1,000 to 24 per 1,000 in the ten years since independence. Projections of the Nigerian population made by the Demographic Unit of the University of Ife envision a continuing decrease in the mortality level to 14 per 1,000 population in 1990 (Caldwell and Igun, 1971). This information confirms the prevailing view at the 1966 Ibadan Population Conference, as reported by John Caldwell: "Despite the uncertainty about levels and trends, the conviction is widespread that death rates are falling, perhaps rapidly" (Caldwell, 1968b, p. 11).

Yet there has been no corresponding drop in birth rates. This is the basic cause

TABLE 1. Health expenditures of West African governments.

Country	Year	Amount of recurring budget	Approximate percent of total government recurring budget	Per capita
Dahomey	1965	US\$ 3,946,000	12	\$1.75
Ivory Coast	1965	\$12,435,000	10	\$3.40
Niger	1965	\$ 2,256,000	9	\$0.68
Senegal	1965-1966	\$12,232,000	9	\$3.65
Upper Volta	1965	\$ 3,335,000	10	\$0.70
Mali	1965	\$ 4,506,000	11	\$0.98
Central African Republic	1965	\$ 2,785,000	10	\$1.85
Chad	1965	\$ 3,327,000	10	\$1.00
Congo (Brazzaville)	1965	\$ 3,077,000	8	\$3.60
Gabon	1965	\$ 2,777,000	9	\$4.40
Cameroon	1965-1966	\$ 8,817,000	11	\$1.75
Togo	1965	\$ 1,850,000	9	\$1.15
Nigeria	1969	\$67,200,000	10	\$1.02
Liberia	1964	\$ 2,618,000	7	\$2.50

Sources: U.S. National Academy of Sciences, National Research Council, Division of Medical Sciences, *Public Health Problems in 14 French-speaking Countries in Africa and Madagascar*, v. II, A Survey of Resources and Needs, passim.

United Nations, World Health Organization, *Third Report on the World Health Situation, 1961-1964* (Official Records of the World Health Organization, No. 155, Geneva, World Health Organization, April, 1967), passim.

of the unusually rapid and increasing population growth in West Africa. Thus, governmental disease control programs have been—and will continue to be—an important factor in accelerating population growth.

Education

West African governments have shown even more interest in education than in health. None of the countries in Table 1 for which information is available spends less on education than on health. In most of them, educational expenditures run two, three, or four times higher than health expenditures. As a result ever-increasing numbers of school-age children are attending school. In the French-speaking countries of West Africa, for example, the number of children in school increased by over one-third in the three-year period 1961-1964 (Hallak and Poignant, 1966, p. 18); in Nigeria primary school enrollments tripled between 1952 and 1960, and secondary school enrollments tripled between 1956 and 1966 (Nigeria, 1966).

Demographic effects of these government expenditures on education and resulting rises in school enrollments are not completely clear. However there are indications that educational expansion is beginning to exert a significant downward influence on birth rates because of two phenomena:

1. Educated couples tend to limit the number of their children. John Caldwell

(1968b) summarizes a recent report on the findings of Sub-Sahara African surveys of desired family size by noting the ubiquitous importance of education:

... in every country where data were presented on the point, the existence and length of formal education has been a major determinant of behaviour patterns. It influences attitudes towards family size, knowledge of contraception, and practice of it. In Lagos, and the pattern is probably similar elsewhere, ten times as many women with tertiary education were practicing birth control as were uneducated women (p. 618).

2. Couples are under economic pressure to limit family size in order to provide education for children. Caldwell (1968b) reports that African surveys show that:

... the chief problem of the large family is clearly that it is an economic burden. ... Equally clear is the fact that educational costs climb steadily from subsistence to cash farming areas and from the latter to the towns, culminating among the urban elite where these costs are the major factor which could lead to the limitation of family size (p. 604).

The impact of educational costs on birth rates is likely to depend on the level of those costs. If education were not available at all or available only at exorbitant cost, parents would realize their inability to provide education regardless of how severely they limited their family size and so could be expected to continue their former reproductive habits. Inexpensive or totally free education could also exert no appreciable effect on family size since parents would be assured of their chil-

dren's education regardless of the number of children. The incentive for fertility limitation comes at a moderate price level at which parents can afford education but only for a limited number of children and only at considerable sacrifice.

Not enough information exists to prove conclusively that the cost of education to West African parents is "moderate" or that educational costs actually influence their reproductive behavior. But it can be shown that governments carry by far the greatest part of educational costs and that, despite this, parents must still continue to contribute a large amount of money relative to their incomes to meet their share of expenses.

The government's contribution is well documented. The Ghanaian government for example, pays the entire US\$20 annual cost for a child's primary school attendance. The parents contribute only a \$1.50 book fee. In secondary schools, the government pays about \$160 per year and requires parents to contribute approximately \$11 for books and uniforms (Ghana Ministry of Education, n.d.). In Northern Nigeria, the government contributes approximately \$12 a year for each child in primary school which covers all expenses except uniforms (Nigeria Federal Ministry of Education, n.d.). In French-speaking Africa, governments contribute annually between \$25 and \$75 per child at the primary school level with parents not required to add much more. According to Hallak and Poignant's (1966) study of this group:

In the aggregate, the [financial] role [of parents] is very modest: in so far as public education is free, the expenses of families represent essentially the school fees in the private institutions of instruction. However, in certain cases, the initiative of individuals takes the form of "in kind" financing, varying greatly with the particular conditions of the region under consideration: thus voluntary construction, the housing of or gifts to the instructor or teacher, etc. (p. 31).

While education would be clearly beyond the reach of most parents were it not for government subsidies, it remains a substantial expense for the individual family. In addition to the costs already cited, parents must also dress and feed children; and in rural areas they forego the advantage of having children assist with farm work.

In Lagos, Nigeria, parents must pay about \$20 annually for each child enrolled in a municipal primary school despite the absence of a tuition fee. Of this total, \$11-\$12 is for books. The

balance pays for required school uniforms, provides school lunches, and allows for contributions for various school activities (interviews with Lagos parents, checked with Nigerian Federal Ministry of Education). The Lagos semi-skilled working man, who earns perhaps \$500 per year will encounter difficulty in trying to keep several children in school: To educate five children would require 20 percent of his income. Despite the free education scheme in Western Nigeria, primary education cost parents between \$6 and \$17 annually in Western Nigeria in the mid-1960s (Callaway, 1967, p. 210). A more recent study has placed the cost of a year of primary education at \$24 to \$45 and estimates that lower-income groups in Western Nigeria spend from 40 percent to 60 percent of their incomes on education for their children (Briggs, 1971, pp. 49-50).

Costs seem to be even higher in rural Togo. Midwives interviewed there said it cost them \$80 a year to keep a child in primary school. Of this \$13 was for books, \$50 for meals, \$15 for uniforms, and \$2 for school fees (Togo Health Ministry Training Team, 1970). Even allowing for the possibility that this figure includes costs that the parent would have to cover anyway, such as meals, primary education is a major expense for these women who earn approximately \$200 per year.

The increasing need for higher education has added to parents' educational costs. In most major cities of West Africa numbers of primary school graduates who could fairly easily find jobs only a few years ago are unemployed. As school attendance becomes more widespread, more education is needed to compete effectively in the job market. This means an additional financial burden for parents. In Ghana educational costs increase from \$1.50 annually at primary school to \$11 at the secondary level—plus another \$125 for boarding fees unless the student obtains a government scholarship. In Nigeria the least expensive secondary schools are those run by the federal government, and these cost \$150 annually for tuition, boarding, and books.

In sum, the expansion of the educational system in a country like Nigeria may well be a primary cause for the growing interest in limiting fertility. Education has been brought within the reach of millions of Nigerian parents prepared to make a significant financial sacrifice for their children. Furthermore, educational

costs are likely to remain as influential in the future as they have been in the past. Even if governments succeed in providing free schooling, as the examples above indicate, school fees represent only a minor portion of parents' total educational expenditures. They are certainly minor compared to the additional expense of supporting children through more years of schooling.

Family Allowances

All 15 French-speaking countries of West Africa have systems of family allowances for government employees and salaried employees of private establishments. Each family covered receives cash payments to cover medical costs during pregnancy and at delivery. In addition, monthly payments based on the number of children in a family are given to help defray the costs of raising children.

The particulars of family allowance programs vary from country to country, but in most cases the amounts are substantial relative to families' incomes. In general, the programs provide monthly payments during pregnancy plus an additional payment at delivery. The combined values of these vary from \$25 (Chad, Mali) to \$50 (Senegal) and \$70 (Guinea). Subsequent monthly payments range from \$1.25 a child per month (Chad) to \$4 a child per month (Guinea, Gabon). These payments continue until the child reaches age 14 or 15 years (12 in Guinea, 17 in Gabon), with provision for extension to 18 or 21 years if the child remains in school, becomes an apprentice, or is an invalid.

In Cameroon, Gabon, and Mali, there is no restriction on the number of births covered. The more common pattern in other countries is to limit the delivery payments to the first three births. Monthly support payments are given for an unlimited number of children in all countries except Guinea (U.S. Department of Health, Education, and Welfare, 1967, *passim*).

The importance of these family allowances can be seen in Dahomey. In Cotonou and Porto Novo, typists earn approximately \$45 per month, sales personnel and telephone operators about \$60 per month (Dahomey Office of Statistics). Under the Dahomean system of family allowances, such personnel would receive prenatal benefits of \$25 for each child plus an additional payment of \$20 at the time of delivery for the first baby, \$10 for the second and third, and nothing for subsequent children. Parents then receive a

monthly child support payment of \$2.50 per child (U.S. Department of Health Education, and Welfare, 1967, pp. 60-61). A Dahomean clerk would thus receive about \$45—almost a month's salary—in prenatal and delivery benefits for the first child and \$35 for the second and third. If there were six children in the family, he would receive \$15 per month, increasing his base salary by approximately one-third.

Some French-speaking West African countries also have a higher schedule of benefits for upper-level government employees. Dahomey can again serve as an example. Under this more lucrative program, professional and administrative government officials (*fonctionnaires*) receive \$10 a child per month. The average monthly salary after taxes for these career men starts at \$150-200, and can rise to \$250-300 after ten years of service (interviews in Cotonou, Dahomey, February 1970). A civil servant with six children would draw about \$60 per month in family allowances, increasing his take-home pay by one-quarter.

The value placed on this assistance by those receiving it was demonstrated in Dahomey in 1969. The government, faced with one of its periodic financial crises, tried to cut back the \$10 monthly "child support" payments to the \$2.50 per month allowed the average wage-earner. Government officials went on strike. The government eventually capitulated, retaining the \$10 monthly payment level but limiting the benefits to a maximum of six children.

Since these particular family allowance programs apply only to government employees and salaried workers in private institutions, a relatively small part of the population benefits from them. In Dahomey and Togo, for example, those eligible constitute only 10-15 percent of the labor force. In other countries of West Africa, the proportion is less than 5 percent, and in few countries does it exceed 20 percent. Yet the eligibles are an important group because they constitute the modern urban elite, or those who normally would be concerned first with fertility limitation. Any program that slows acceptance of family planning by this pace-setting group retards its acceptance by the society as a whole.

No available data show whether or not family allowance programs actually influence the recipients' reproductive behavior and the society's population growth. But insofar as family allowances have any

effect at all, it is presumably toward higher rather than lower population growth.

Governmental Policies that Affect Rural-Urban Migration

Government development policies also unintentionally affect migration. Almost all West African governments, for example, are promoting industrialization and modernization as fast as their resources will allow. There is a natural tendency for industry to be located in cities and towns. This concentration propels people from rural to urban areas in search of employment.

In addition, many government financial policies, by increasing the balance between rural and urban incomes, have an effect on migration. The common practice of granting government marketing boards a monopoly on purchases of such export crops as cocoa, rubber, or groundnuts (peanuts) at a price well below the world market diverts the profits into the public treasury and lowers rural incomes relative to urban incomes. One study of Nigerian Marketing Boards indicates that from 20 percent to 30 percent of potential producer income never reaches the producer (Heilleiner, 1964, pp. 606-610).

In many instances, rural dwellers are charged the same rate as urban dwellers for services not provided in rural areas. Sir W. Arthur Lewis (1969) described the situation in his 1968 Aggrey-Fraser-Guggisberg lecture at the University of Ghana:

The fundamental reason for this (current drift to the towns) is the big gap which has now opened up between urban wages and the farmers' incomes. . . . An unskilled labourer in Lagos, in full employment, is paid twice as much as the average farmer earns. . . . Moreover, the gap is not confined to personal earnings, for there is an even bigger gap in public services. The governments levy taxes on the farmers and use the money to provide water supplies, medical services, secondary schools, electricity, and transport not in the rural areas but in the town. In these circumstances any young man who stayed in the countryside instead of migrating to the towns ought to have his head examined (pp. 29-30).

Another government policy that vastly influences migration is educational development in rural areas. Professor Lewis cites the problems:

In Africa this swift transition [from limited to widespread primary education in rural areas] has raised the additional and more negative problem of the effect of frustrated expectations. For, in a country where only 10 percent of children finish primary school, and there are virtually no secondary schools, any boy who finishes primary school is

assured of a clerical job in town at a high salary. The primary school is thus established in the minds of parents and children as a route to a white collar urban job. But when 50 percent are finishing primary school, and in addition a new flow of secondary school boys are taking the clerical jobs and the jobs for elementary school teachers, the primary school graduate can no longer find this kind of work. However, it takes time for people to recognize that times have changed. For some years the primary school graduates continue to make a beeline for the towns, where they become unemployed. Depopulation of youth from the countryside, coupled with heavy unemployment in the towns, is now standard in most African countries which have been accelerating primary education. One starts off opening up schools in rural areas in the hope of having literate farmers, and finds instead the effect is that the brighter minds simply emigrate from the countryside into unemployment (pp. 27-28).

CONCLUSION

In sum, few West African governments influence population growth intentionally, but all do unintentionally through economic and social development policies. Not enough is known about the quantitative effects of these policies to give a precise evaluation of their overall impact. But the effect of health programs upon mortality has been so spectacular that the overall impact is clearly to accelerate population growth, even compensating for the possible offsetting effect of education.

Many more governments consciously seek to influence migration. These efforts appear to have succeeded in limiting international migration. But they have failed to slow rural-urban migration, primarily because of the offsetting effect of government policies on such matters as industrialization, education, and taxes.

For those who think rapid population growth and rural-urban migration undesirable, these unintended effects of development policies are unfortunate. However, unfortunate population effects do not necessarily mean these policies should be scrapped. To pay attention only to the population effects of health policies, for example, would be to ignore the inestimable value of good health.

Improved public health may quite legitimately be judged so beneficial that it should be promoted despite an undesirable population impact. But West African policy makers should be aware of the population implications of their actions. For only when the impact of development policies is recognized can needed corrective measures be designed and implemented.

So far, West African policy makers have largely ignored the population aspects of development. But their concern about population is growing. Four years ago, few would have predicted that Ghana and Nigeria would have adopted population policies or that Dahomey or The Gambia would have commissioned studies of their population situations. The trend is clearly with those who believe that population questions are too important to be ignored.

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Family Planning Acceptors in Lagos, Nigeria

by ROBERT W. MORGAN

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In Lagos, Nigeria, we made a comparative study of family planning clinic patients and a sample of married women aged 15-49. Our purpose was to look for indications of the kinds of persons who might in time attend family planning clinics in Lagos and elsewhere in Nigeria, given further health education and the opening of additional clinics. Our major findings were as follows:

With respect to demographic indicators, marital status was found not to be a significant factor in clinic attendance. Age and parity were found to be highly significant, women aged 25 to 39 and women with more than three living children being represented in greater proportions among clinic attenders than in the population at large.

With respect to socioeconomic indicators, virtually all clinic acceptors in Lagos are from the lower socioeconomic classes. Data on clinic patients, when compared with data on a sample of the Lagos population at large, suggest that religious and ethnic factors are not significant in family planning acceptance,

and that the most important single factor is education. Those at all educational levels were represented in proportionally greater numbers among clinic attenders than among the female population at large.

Among acceptors, over the entire period studied, 1958-1968, the IUD was found to be the preferred contraceptive method. However, in recent years, preference for the pill has emerged.

Lagos, because of its size—over a million people live in the metropolitan area—the level of modernization and industrialization, and its cosmopolitan nature, is probably unique in tropical Africa, and the findings here must be viewed with this in mind. Modern contraceptive practice is a new idea in Lagos and relatively few persons have actually attended a family planning clinic—approximately 20,000 women.

Sources of Data

Our data are drawn from three surveys conducted by the Department of Community Health of the University of Lagos

College of Medicine: a study of family planning acceptors, a survey of socio-demographic characteristics of the population, and a knowledge, attitudes, and practice (KAP) survey of a subsample of women. The acceptor survey covered social and fertility characteristics of family planning clients over the period 1958-1968, the first decade of official family planning activity in the city. Data cover approximately 7,750 patients registered as acceptors of some form of modern contraception at the clinics. A brief review of the history of family planning in Lagos will help to place these data in perspective.

Although the first family planning clinic in Lagos was opened in 1958, there was no formal family planning program until 1964. The first clinic, in a midwife center on Lagos Island, was open one evening a week and offered diaphragms, condoms, and chemical contraceptives—the pill and the IUD were not available until the early 1960s. During the seven-year period 1958-1964, about 600 contraceptive patients—around 50-100 per year—were registered. Reasons for these low attendance figures include lack of funds and of governmental support, the inadequacy of available contraceptive techniques, the widespread faith of the Nigerian public in traditional contraceptive techniques, including the use of charms, abortifacients,

TABLE 1. Number of contraceptive users registered by year, Lagos metropolitan area clinics.

Year	Clinic location			Total
	Lagos island	Lagos mainland	Suburban	
1964 and earlier	91	9		100
1965	398	154		552
1966	771	356		1,127
1967	1,146	853	43	2,042
1968	1,388	1,938	97	3,423
Total ^a	3,794	3,310	140	7,244

^a Excludes 121 patients for whom year of registration was not recorded and 350-400 patients registered at Broad Street Clinic during 1958-1964, whose cards cannot be found.

and the traditional period of abstinence from sexual relations during lactation, and the cultural value placed in many African societies on large families.

In 1964, the National Council of Women's Societies, with headquarters in Lagos, agreed to sponsor family planning. In November of that year, the advisory committee set up by the society was formally inaugurated as the Family Planning Council of Nigeria. Additional clinics were opened in Lagos, and clinic registrations rose rapidly during the period 1965-1968, the totals for each year being 552, 1,127, 2,042, and 3,423 respectively (see Table 1).

This period coincided with the initiation of educational programs at various institutions in the city, the beginning of house-to-house field worker visits by groups from the Department of Community Health and the Family Planning Council, and funding from foreign agencies. Though not included in the present analysis, registrations continued to rise during 1969 and 1970 to 4,860 and 4,958 respectively.

Currently, all clinics are operated or assisted by the Family Planning Council. Most meet one night weekly and are staffed by one or two doctors and several nurses recruited from various medical facilities in the city. The Council operates

one full-time day clinic on Lagos Island and the University of Lagos operates two primarily research and training clinics on Lagos mainland.

For the 1967 sociodemographic survey, 30 sample blocks were chosen at random, each block containing a residential population of 400-500 persons. Selection was based on population densities in different parts of the city as indicated by the 1963 census. The sample consisted of every permanent resident in each block at the time of the survey, and a total of 13,141 persons were thus enumerated, including 2,842 women in the 15-49 age group. Eighteen of the sample blocks were located in what was then the separately governed Federal Territory of Lagos, and 12 blocks were located in immediately contiguous urban areas in what was then Western Nigeria. All parts of the metropolitan area now lie within the newly-created Lagos State. The 1968 KAP survey covered marital and fertility characteristics of a sub-sample of 729 women aged 15-49 drawn from the 30 blocks. Data on the total population of patients were drawn from actual clinic record cards and registers. The latter contained information on age, education, religion, ethnic group, marital status and parity, in addition to clinical material including contraceptive method prescribed.

TABLE 2. Age distribution, Lagos metropolitan sample, clinic attendants, and 1963 federal census.

Age (years)	Lagos survey		Clinics		1963 federal census	
	Number	Percent	Number	Percent	Number	Percent
15-19	533	18.8	117	1.6	24,996	17.0
20-24	599	21.1	769	10.6	37,491	25.4
25-29	577	20.3	2,027	27.9	32,242	21.9
30-34	456	16.0	2,265	31.1	21,530	14.6
35-39	307	10.8	1,328	18.3	14,003	9.5
40-44	227	8.0	641	8.8	10,630	7.2
45-49	143	5.0	129	1.8	6,560	4.4
Total ^a	2,842	100.0	7,276	100.0	147,452	100.0 ^b

^a "Not Recorded" cases omitted in most tables. Most of these omissions resulted from variations in clinic record cards in the earlier years. The population "bulge" in approximately the 20-34-year age groups may be attributed to youthful in-migrants to the city who are seeking employment, and is reflected in all recent Lagos censuses and sample surveys.

^b Percent totals given as 100.0 throughout, although apparent totals may vary slightly due to rounding.

Demographic Indicators

AGE

Table 2 presents the age distribution among acceptors, among the Lagos sub-sample, and from the 1963 census for the former Federal Territory. The census material is comparable only with the material for 18 of the 30 sample areas. Census data for Western Nigeria were published according to political divisions as a whole and distinctions were not made between urban fringe areas of Lagos and villages in the same division that were not included in our sample.

Women aged 15-24 are underrepresented at the clinics—that is, their proportion is lower than the proportion of women in the same age groups in the urban sample. Women aged 25-39 are overrepresented, that is, represented in greater proportions than in the population sample; women aged 40-44 are represented in about the same proportion as in the sample, and women aged 45-49 are again underrepresented.

From these comparative data, one can infer that women who become concerned about family size do so at about age 25 and this concern continues up to the early 40s. Since Ohadike (1968) has shown that the mean age at marriage for Lagos women is about 20 years—as compared with a lower age in the rural areas—the most surprising conclusion from these data is that these women apparently begin to recognize the need for child-spacing and family planning quite soon after marriage.

MARITAL STATUS

A review of the data (Tables 3-4) suggests that marital status is in general not a significant factor in clinic attendance. Data on clinic patients are compared with data from the 1968 Department of Community Health KAP Survey. During 1958-1968, most Family Planning Council clinics did not as a matter of policy render service to unmarried women. A number of unmarried women may have obtained service at the clinics by reporting themselves as married, and these women probably reported themselves as married monogamously. In reviewing Tables 3-4 one should therefore begin by adding, in the "clinics" and the KAP survey columns, the "never married" women to those women married once or married monogamously. Once this is done, only slight variations appear between clinic patients and the sample population. Of particular interest in this connection is

Table 4, in which if this mathematical correction is carried out the monogamy versus polygamy factor disappears entirely, even to the first decimal point.

Our finding that polygamously married women attend family planning clinics in the same proportions (as readily) as do monogamously married women is corroborated by previous research: Ohadike in his 1964 survey in Lagos reports that fertility differences between monogamously and polygamously married women were slight and probably not analytically significant (Ohadike, 1968).

The slight differences that appear, for example with respect to "widowed" women in Table 3, can probably be attributed more to misreporting at the clinics than to actual social difference. A woman can report any marital status she wishes when registering at a clinic, and she may say simply that she is married rather than any other status. (The Lagos KAP Survey is believed to be more accurate; it was an in-depth study carried out over a period of weeks, not only among the respondents themselves but among other household members, neighbors, and friends.) In summary, given the data in Tables 3 and 4, relatively few differences in clinic attendance patterns can be demonstrated based on marital status alone.

FERTILITY

Important differences between acceptors and the sample population appear in the data on fertility (Tables 5 and 6). Women with zero to two children are represented in lower proportions at the clinics than among the population; women with three children are represented in almost the same proportion as in the sample of the population at large; and women at all higher parity levels are represented in the greater proportions in the clinics. This implies that women in Lagos who practice family planning begin to think about child-spacing after having a third child.

This finding is particularly significant when one considers that the KAP survey, like most other KAP surveys in West Africa, found an ideal family size of about six children, including four sons and two daughters, among the females interviewed (as did a parallel survey among Lagos males). If women begin thinking about resting or spacing their pregnancies after the third child, it would seem that they do not plan to have six children, and their actual preferred family size may be

TABLE 3. Marital status, women aged 15-49, Lagos KAP survey and clinic attendants.

Marital status	Lagos KAP survey		Clinics	
	Number	Percent	Number	Percent
Never married	56	8.3	12	0.2
Married	583	86.9	6,313	95.8
Divorced or separated	18	2.7	233	3.5
Widowed	14	2.1	29	0.4
Total	671 ^a	100.0	6,587	100.0

^a Excludes 60-70 women who refused to give information on marital status.

TABLE 4. Type of marriage, women aged 15-49, Lagos KAP survey and clinic attendants.

Type of marriage	Lagos KAP survey		Clinics	
	Number	Percent	Number	Percent
Never married	56	8.3	10	0.2
Married monogamous	366	54.1	3,107	62.2
Married polygamous	254	37.6	1,881	37.6
Total	676 ^a	100.0	4,998	100.0

^a Excludes 60-70 women who refused to give information on marital status.

TABLE 5. Number of living children, women aged 15-49, Lagos KAP survey and clinic attendants.

Number of living children	Lagos KAP survey		Clinics		Expected number at clinics	Ratio $\times 100$
	Number	Percent	Number	Percent		
0	123	18.2	63	0.9	1,330	5
1	135	20.0	297	4.1	1,462	20
2	140	20.8	706	9.7	1,521	46
3	108	16.0	1,206	16.5	1,170	103
4	72	10.7	1,648	22.5	782	211
5	50	7.4	1,532	21.0	541	283
6	28	4.2	1,077	14.7	307	351
7	12	1.8	455	6.2	132	345
8	4	0.6	230	3.1	44	523
9+	2	0.3	97	1.3	22	441
Total	674	100.0	7,311	100.0		

less than six. Women may cite the number "six" in attitude surveys either because they think this is the approved number or because they think this is the number their husbands want. Certainly our impression at the Lagos clinics is that the majority of women, probably three-quarters of them, come in for contraceptive service without their husbands' knowledge. On the other hand, Nigerian husbands may also be becoming concerned about the expenses involved in raising a large family, and they too may prefer fewer children than the stated ideal. Almost 70 percent of respondents, both male and female, in the KAP survey gave economic factors such as the cost of educating a large family as one of "the bad things about having a lot of children," and this response pattern has been reflected in most other West African surveys (Caldwell, 1968).

The data on number of live births (Table 6) parallel the data on number of living children (Table 5), but with some

interesting differences. One of the critical problems in West Africa, as in other parts of the developing world, is the high level of infant and child mortality. It is known that many parents embark on repeated pregnancies as a form of insurance, hoping that some children born will survive but fearing that many will die. A central issue among pediatricians concerned with family planning in West Africa thus has become whether family planning should be introduced on its own, so to speak, or whether improved pediatric services and a demonstrated decline in child mortality must first be effected, after which mothers would then be prepared to practice pregnancy spacing.

While the numbers are small, Tables 5 and 6 offer some support for the latter hypothesis. Among clinic acceptors, the median figures are women with 4.8 living children and 5.6 live births, indicating an average loss of one child per parent. If one examines expected numbers of clinic acceptors in each category, one sees that

TABLE 6. Number of live births, women aged 15-49, Lagos KAP survey and clinic attendants.

Number of live births	Lagos KAP survey		Clinics		Expected number at clinics	Ratio $\times 100$
	Number	Percent	Number	Percent		
0	91	13.6	49	0.7	993	5
1	106	15.8	244	3.3	1,154	21
2	109	16.2	526	7.2	1,183	44
3	95	14.2	888	12.2	1,037	87
4	71	10.6	1,216	16.6	774	157
5	72	10.7	1,263	17.3	782	162
6	59	8.8	1,238	16.9	643	193
7	33	4.9	846	11.6	358	236
8	14	2.1	540	7.4	153	353
9+	21	3.1	494	6.8	226	219
Total	671	100.0	7,304	100.0		

TABLE 7. Educational levels, women aged 15-49, Lagos metropolitan sample and clinic attendants.

Education	Lagos survey		Clinics	
	Number	Percent	Number	Percent
No formal	1,605	56.9	1,931	38.7
Primary only	803	28.5	1,876	37.6
Secondary and higher	411	14.6	1,180	23.7
Total	2,819	100.0	4,987	100.0

TABLE 8. Ratios of actual to expected numbers of clinic patients in each educational category.

Education	Actual	Expected	Ratio $\times 100$
No formal	1,931	2,891	67
Primary only	1,876	1,456	129
Secondary and higher	1,180	640	184

for zero, one or two births the ratios of actual to expected numbers are virtually identical, whereas at higher levels women with more living children become progressively better represented. This suggests that the death of a child does in fact deter a woman from family planning.*

For the Lagos KAP sample, the median numbers are 2.6 living children and 3.3 live births. The spread here is similar, that is, an average of 0.7 children lost per mother as compared with a figure of 0.8 for the clinic acceptors. One may suspect an underreporting of child deaths in both surveys, which are retrospective rather than prospective. At the same time, the figures are not far out of line with other more detailed studies conducted in the Lagos Metropolitan area, and one must also recall that child mortality is likely to be lower in the city with its more sophisticated medical services than in the remoter villages. Based on several urban and rural demographic surveys in Nigeria, this writer has estimated elsewhere an

average of 5.7 surviving children and 1.6 children lost per mother in Lagos and an average of 3.5 surviving children and 2.1 children lost in rural Nigeria (Morgan, forthcoming). This would mean an average of 7.3 live births per mother in Lagos, and, assuming that the average woman in the KAP sample had passed halfway through the childbearing period, figures of 2.9 living children and 3.7 live births would be expected, not far different from the KAP figures, and suggesting only a slight underreporting of deaths.

Socioeconomic Indicators

EDUCATION

Most clinic patients are drawn from the lower classes in the Lagos urban area. The relatively small wealthy elite in the city, if they wish family planning, are more likely to turn to private doctors for service.

Table 7 shows that 37.6 percent of clients have had some primary schooling compared to 28.5 percent in the general survey. A total of 23.7 percent have advanced as far as secondary school, compared to 14.6 in the general survey.

The influence of education on clinic

attendance becomes even clearer when, in Table 8, the actual number of clinic patients in each group is compared with the expected number based on data from the sample population. Women with no schooling are represented in the clinics only 67 percent as well as in the population at large, whereas the corresponding ratios for the other two groups are 129 and 184 respectively.

With increasing emphasis on education throughout Nigeria, and with the high costs associated with education beyond the primary school level, this finding has important implications for the future of family planning in the country. Almost all family planning KAP surveys conducted in West Africa have demonstrated parents' concern about the cost of educating a large family and the high value they place on large families.

RELIGIOUS AND ETHNIC DISTRIBUTION

Religious and ethnic factors are not significant indicators of family planning acceptance; although at first glance the data would seem to indicate differences in fertility behavior by religion. According to Table 9, Muslims are underrepresented at the clinics, Protestants are overrepresented, and Roman Catholics are represented almost precisely in proportion to their numbers in the population at large.

The "others" category comprises for the most part the Separatist sects, that is, members of local churches such as Cherubim and Seraphim or Christ Apostolic who have split off from parent Christian missions. Normally these sects are grouped with Christians, but the Family Planning Council lists them in the "other" category in its record cards. We used the following procedure to estimate the proportion of Separatists among acceptors: in the Lagos demographic survey, Separatists comprised 7.2 percent of the total population, those who professed adherence to traditional African religions 0.4 percent, and members of "other" religions (predominantly foreigners) 0.9 percent. From this we inferred that Separatists comprised about 85 percent of the "others" category in our clinic patient analysis. From this estimate, Separatists would appear to be somewhat underrepresented at the clinics.

Based on the data in Table 9, among Christians in Lagos, Protestants are best represented, Roman Catholics are less well represented, and Separatists are represented least. One could interpret these findings as follows. The proportion

* Regrettably, direct data on children lost by each mother are not available, because the coding scheme used was developed by another researcher to fit a specific computer program and did not contain this information.

of Roman Catholic clients is probably smaller than that of Protestants because of the adverse influence of Papal authority: nurses in family planning clinics in Lagos have reported that Roman Catholic patients have on several occasions come to have an IUD removed, giving as their reason the adverse statements of the Pope. Separatists are least well represented among Christians, and two reasons for this can be given. First, these splinter-group churches are presided over by locally trained clergy known collectively as "Prophets," who in addition to their religious duties perform faith healing similar to that in Christian Science and also have a considerable obstetrical practice in their churches. The Prophets tend to be opposed on professional grounds to modern medical techniques, including family planning. Second, the Separatist movement is more African than foreign in its impetus, whereas modern contraceptive techniques clearly are foreign imports. The Prophets are in general well-informed and where we have encountered them in our surveys, we have succeeded in gaining their support for our research and for family planning. This is sociologically significant, since the conversion of a Prophet usually means the conversion of his many followers.

More difficult to explain, at first glance, is the apparent underrepresentation of Muslims at the clinics. For most Muslims in Lagos, religion does not hold the same preeminent position in life that it does in the north where Emirs and other religious leaders have up to very recent times continued to exercise much political and judicial authority. Thus, it seemed unlikely that their underrepresentation could be attributed to religious mores.

We hypothesized that it might be due to ethnic origin and adherence to cultural traditions that would preclude use of modern contraceptives. Virtually all Lagos Muslims are members of the Yoruba tribe, which made up some 86 percent of the sample population in the demographic

TABLE 9. Religion, women aged 15-49, Lagos metropolitan sample and clinic attendants.

Religion	Lagos survey		Clinics	
	Number	Percent	Number	Percent
Muslim	1,497	53.3	2,144	42.4
Roman Catholic	321	11.4	596	11.8
Protestant	736	26.2	2,017	39.9
Others ^a	257	9.1	294	5.8
Total	2,811	100.0	5,051	100.0

^a "Others" in most cases represent adherents to the so-called "Separatist" sects, see text.

TABLE 10. Religion, Yoruba women only, aged 15-49, Lagos metropolitan sample and clinic attendants.

Religion	Lagos survey		Clinics	
	Number	Percent	Number	Percent
Muslim	1,422	59.6	1,872	45.8
Roman Catholic	146	6.1	298	7.3
Protestant	630	26.4	1,628	39.9
Other	188	7.9	286	7.0
Total	2,386	100.0	4,084	100.0

survey. Dr. Olatunde Oloko of the University of Lagos has suggested that the Yoruba Muslim group in Lagos might be sociologically more closely knit than other religious groups and hence slower to accept any form of change.

To test the ethnic factor, the data for Yoruba women alone were analyzed (Table 10). In the demographic sample about 60 percent of Yoruba women were Muslim and the remainder mostly Christian. For this single ethnic group the religious factor remains approximately the same as in the population at large, Muslim Yoruba women being underrepresented at the clinics, Roman Catholic Yoruba women being represented in about the same proportion as in the population at large, and Protestant Yoruba women being overrepresented. Since most Separatists are Yorubas, their proportion in Table 10 is higher than in Table 9, but the difference is artificial. It can thus be said that ethnic origin is not the explanatory factor.

When data on religion are cross-categorized by data on education, for both the demographic sample and the clinic

sample (Table 11), the reasons for the Muslim underrepresentation become apparent:

- The majority of unschooled women in both groups are Muslim (70 percent of the Lagos sample and 64.8 percent of clinic attendants).
- The majority of women who have had any schooling at all, whether primary or higher, are Christians (69.6 percent of the Lagos sample and 73.3 percent of clinic attendants).
- Within each religious grouping, women with schooling are represented in greater proportions at the clinics than in the population at large.

It would therefore appear that education is the predominant socioeconomic factor in clinic attendance whether among Muslims or among Christians and whether among one tribal group or another. The factors of religion and ethnic origin would thus seem not to be directly significant (with the exception as previously noted that within the Christian subgroups,

TABLE 11. Education, by religious affiliation, Lagos sample and clinic attendants.

Education	Women aged 15-49, Lagos sample						Family planning clinic attendants					
	Muslims		Christians		Total		Muslims		Christians		Total	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
No formal	1,126	75.4	473	36.0	1,599	57.0	1,251	60.6	680	23.3	1,931	38.8
Primary only	280	18.8	520	39.6	800	28.5	604	29.3	1,271	45.6	1,875	37.7
Secondary and higher	87	5.8	320	24.4	407	14.5	209	10.1	964	33.1	1,173	23.6
Total	1,493	100.0	1,313	100.0	2,806	100.0	2,064	100.0	2,915	100.0	4,979	100.0

TABLE 12. Types of contraceptives prescribed, by year, Lagos clinics.

Year	Pills	IUD	Dia-phragm	Foam	Other	Total
1964 and earlier	10	38	35	0	0	83
1965	76	287	153	8	7	531
1966	140	820	103	11	5	1,079
1967	142	1,723	61	20	6	1,952
1968	383	2,561	72	47	21	3,084
Not recorded	16	63	20	1	0	100
	767	5,492	444	87	39	6,829 ^a
Total	(11.2%)	(80.4%)	(6.5%)	(1.3%)	(0.6%)	(100.0%)

^a Not including 536 patients registered who had service deferred to await evidence of non-pregnancy (i.e. to await next menstrual period) which is the practice at most clinics. Experience has shown that up to the time of recently tried free clinics, more than 90 percent of women who have paid their registration fee do return for service. Recent experimental free clinics have produced a greater number of acceptors and a higher proportion of defaulters. It should also be recalled that the pill and IUD were not introduced until the latter part of the 1958-1964 period.

TABLE 13. Ratio of IUD to pill patients, 1958-1970.

Year	IUD	Pill	Ratio: $\frac{IUD \times 100^a}{Pill}$
1958-1964	38	10	380
1965	287	76	380
1966	820	140	590
1967	1,723	142	1,210
1968	2,561	383	670
1969	3,331 ^b	1,144 ^b	290
1970	2,880 ^b	1,902 ^b	150

^a Other methods omitted.

^b Not including figures for two small suburban clinics in Ikeja and Shomolu.

Roman Catholics and Separatists are less well represented than Protestants.)

Contraceptives Prescribed

Table 12 presents the distribution of acceptors by method. During 1958-1968 the IUD was used by the majority of patients (80.4 percent). In the years 1968-1970, however, the proportion of IUD users fell off sharply, and by the end of 1970 the pill was almost as prevalent in use as the IUD (see Table 13). Rocco De Pietro (1971) reviewing the years 1969-1970, has suggested that this trend repre-

sents a growing dissatisfaction with the IUD in Lagos. A broader review of the full span of modern contraceptive use in Lagos during 1958-1970 (Table 13) indicates another trend: in the earlier years pills were used to a much greater extent; with the intensive health education campaigns beginning in 1966 which focussed on the IUD, the use of the IUD increased to a high in 1967, the ratio of IUDs to pills prescribed in that year being approximately 12 to 1; and in succeeding years the proportion of pill users has reverted to and more recently surpassed earlier

levels. One might surmise from these data that the pill since its development has been one of the preferred contraceptives in Lagos.

Conclusion

Three social and demographic factors emerge from this study as predictors of use of family planning in Lagos: age, parity, and educational level. Women who accept family planning appear to be motivated to do so starting at age 25 and after three live births. These findings are surprising in view of KAP findings that the ideal family size in Lagos is six children. The presence of any degree of education was found to increase the likelihood of practice of birth control.

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Use of Oral Contraceptives in Urban, Rural, and Slum Areas

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In Howrah District in India, between November 1968 and June 1970, we made a comparative study of the acceptability and use-effectiveness of oral contraceptives in three clinics in different settings (urban, rural, and slum areas). Contraceptives were distributed by clinics free of charge. Field workers made repeated visits to eligible couples to persuade them to accept at the clinics. The major findings of the study were as follows:

In the urban area, where the program was publicized before its initiation, a majority of acceptors attended the clinic prior to contact with field workers and more than a quarter attended after only one contact. In the rural area, a large majority came to the clinic after one contact with field workers, but in the slum area, the majority of acceptors came only after the second or third contact.

The cumulative continuation rates after different cycles of use computed by the life-table method were highest in the rural area and lowest by far in the slum area. The slum acceptors showed higher drop-out rates through the entire period of use.

The cumulative continuation rates tended to be highest in the urban area for the age groups 25-34 and for women with four or five living children. The rates were higher for literates but the difference between literates and illiterates was substantial only in the slum area. The rates were also higher in the slum area for women who joined the program after repeated visits by field workers than for those who came after, at most, one visit.

For all segments combined, the proportionate increase in the cumulative continuation rate was most marked in the slum area.

Although the proportion of acceptors complaining of side effects was quite large, particularly after the first cycle of use, the number finally discontinuing because of side effects was relatively small. The most important reason for discontinuation in the slum area was related to problems of use other than side effects,

whereas a majority discontinued in the urban area for reasons not connected with use of the pill. In the rural area where the total number of women finally discontinuing was comparatively smaller, problems of use other than side effects and other reasons were almost equally important.

Background

In November 1968, the Humanity Association started its Family Welfare Planning Project for studying acceptors of oral contraceptives distributed by three clinics in the district of Howrah, West Bengal. The first clinic, designated as urban, is in central Howrah town on the River Hooghly opposite Calcutta. The second clinic, also in the town, is located in a slum area. The third clinic functions in a rural area about seven miles away from Howrah and serves seven villages.

Each clinic served an area with a population of roughly 10,000 according to the 1961 census. Married women aged 15-44 who were regularly menstruating

and eligible on medical grounds for taking supplies of oral contraceptives were included in the project.

Two field workers, a man and a woman, visited each household in their respective areas to collect information about eligible couples and to persuade women to become acceptors of orals and visit clinics on specified dates. In case of a refusal or broken appointment, the social workers made two more attempts at persuasion. When a woman came to the clinic, she underwent a medical examination and in the absence of contraindications, was supplied with a cycle of orals.

The oral contraceptive first introduced was Ovulen. Later a change was made to Ovral, containing a lesser dosage of estrogen, in conformity with the policy of the Government of India.

Characteristics of Women

Characteristics of women contacted are shown in Table 1. During the period November 1968 to June 1970, 1,429 couples were contacted in the urban area, 1,488 in the slum and 1,304 in the rural. In the urban area all but two of the couples were Hindus whereas in the slum, a majority, 54 percent, were Muslims and 44 percent Hindus, and in the rural, almost two-thirds were Hindus and the remainder almost all Muslims.

TABLE 1. Percentage distribution of eligible women by specified characteristics, for three areas, November 1968-June 1970.

Characteristic	Area		
	Urban	Slum	Rural
Religion			
Hindu	99.9	43.7	64.8
Muslim	0.1	54.0	35.0
Other	—	2.2	0.2
Educational level			
Illiterate	23.9	68.3	59.7
Literate but below primary	32.4	10.5	19.9
Primary	26.7	11.3	14.7
Middle	16.4	9.9	5.9
Age (years)			
Under 20	7.2	9.9	13.8
20-24	20.3	19.3	19.6
25-34	50.0	45.1	41.1
35 and older	22.5	25.6	25.4
Number of living children			
0-1	30.7	33.6	26.8
2-3	32.4	34.7	27.4
4-5	22.9	21.9	27.1
6 or more	13.7	9.8	18.6
Total number of women	1,429	1,488	1,304

TABLE 2. Distribution of acceptors by number of visits by field workers, for three areas, November 1968–June 1970.

Number of visits	Urban		Slum		Rural	
	N	Percent	N	Percent	N	Percent
0	325	53.4	106	22.4	31	9.8
1	177	29.1	105	22.2	257	80.8
2	26	4.3	142	30.0	22	6.9
3	81	13.3	121	25.5	8	2.5
Total	609	100.1	474	100.1	318	100.0

The educational level of the eligible women was comparatively higher in the urban area, but nearly a quarter of even the urban women were illiterate (the criteria of literacy being ability to read and write a simple letter in any language) and another 33 percent, although literate, had not successfully completed the primary four years of schooling. In both the slum and the rural areas, a majority of the eligible women was illiterate and more than three-fourths had not completed the primary stage of schooling.

The proportion of eligible women in the age range 20–34 was 70 percent in the urban area, 64 percent in the slum, and 61 percent in the rural area.

The distribution by number of living children shows that women have, on the average, the largest number of children in the rural area, fewer in the urban, the lowest number in the slum area.

Characteristics of Acceptors

Table 2 shows the distribution of acceptors by number of contacts with field workers before acceptance. The figures in the first row represent the women who

came to the clinic before any contact was made with them at home.

The total number of acceptors during the period November 1968 to June 1970 was by far the highest—609—in the urban area; it was 474 in the slum and 318 in the rural area. In the urban area, both the distribution of oral contraceptives and family planning publicity programs had been part of the Association's welfare activities before the start of the project, although there had been no system of home visits or follow-up of acceptors. The new program received advance publicity through meetings and more than half of the total number of acceptors through June 1970 came to the urban clinic before the field workers had the opportunity to meet them in their homes. A large majority (80.8 percent) came to the rural clinic after the first contact with field workers, whereas among the slum dwellers a majority (55.5 percent) came only after a second or third contact.

In the rural area, the proportions of Hindus and Muslims among acceptors were practically the same as among eligible women, but in the slum area 70.7

percent of acceptors were Hindus and 24.9 percent Muslims although the latter constituted 54.0 percent of all eligible women.

In all three areas, most acceptors were illiterate. In both the rural and urban areas, not only were illiterate women predominant among the acceptors but the proportion illiterate was higher among acceptors than among eligible women. In the slum area, however, the proportion illiterate was considerably lower among acceptors than among the eligible population. The response in the slum areas may be related more to the couples' preferences in contraceptive methods and the availability of methods than to socioeconomic factors. We shall see later that many women in the slum area changed from the pill to condoms which had been available in the area for a longer time.

The age composition and the distribution by number of living children of program acceptors can be seen in Table 3. The acceptance rates (Table 4) per hundred eligible couples are higher in the urban area at ages under 25 than at older ages, the rate being maximum at ages 20–24. Likewise in the slum area the acceptance rate is highest in the 20–24 age group but the decline at older ages is comparatively smaller. In the rural area the rate is very low at ages under 25, rises steeply in the age group 25–34, and shows a slight fall at older ages. A marked variation is also apparent between the three areas in the acceptance rates by number of living children. In the urban area the rate is highest for women with two to five children and drops slightly for those with six or more children. In the slum and rural areas, however, the rates become progressively higher with increase in the number of living children and are highest for women with six or more children.

Continuation Rates by Area

Cumulative continuation rates were calculated by the life-table method for all acceptors of pills during the period November 1968 to June 1970. The data, except where otherwise stated, relate only to the first segment, that is, the experience from the start of the use until the first discontinuation or the cutoff date for continuing users. A woman who failed to turn up on the due date or the day after was not given the supply for the cycle and was treated as discontinuing if she visited the clinic later or did not return even when contacted by field workers. The cases lost to follow-up were taken into

TABLE 3. Percentage distribution of acceptors by specified characteristics, for three areas, November 1968–June 1970.

Characteristic	Urban	Slum	Rural
Religion			
Hindu	100.0	70.7	64.8
Muslim	—	24.9	35.2
Other	—	4.4	—
Educational level			
Illiterate	41.0	46.4	70.4
Literate but below primary	11.7	14.6	8.8
Primary	30.8	18.6	15.7
Middle and above	16.4	20.4	5.0
Age (year)			
Under 20	8.9	7.2	6.0
20–24	30.4	22.8	15.7
25–34	47.7	48.0	51.3
35 and older	13.0	22.0	27.0
Number of living children			
0–1	17.7	14.0	6.9
2–3	39.2	33.3	29.6
4–5	28.2	28.6	32.4
6 or more	14.8	24.1	31.1
Total number of women	609	474	318

account for the intervals of use contributed by them but were not treated as discontinuers. There was, however, no case of a woman lost to follow-up in the rural area. The women who were lost to follow-up, were dropouts, or were not yet scheduled to return to the clinic at the cutoff date were credited with continuation up to the middle of the cycle following their last clinic visit.

The probability of continuation (Table 5) was highest in the rural area, but the most outstanding difference is between the slum area on the one hand and the urban and rural areas on the other. The percentage continuing for 12 cycles in the slum area is 30.6 compared to 61.1 in the urban and 66.6 in the rural area.

Differentials in Continuation

BY AGE GROUP

The cumulative continuation rates for different age groups are presented in Table 6. The percentage continuing for a specified number of cycles is highest for the age group 25-29, and only a little lower for 30-34. For all three areas continuation rates at 12 cycles tend to be higher for women over 25 than for younger women, although there is a dropoff after age 35.

In the analysis of the cumulative continuation rates by ages, it is apparent that the patterns in the first two cycles do not indicate clearly the pattern of differentials that emerges after longer intervals. By contrast, a major part of the differential between the three areas at later cycles was found to have been due to differences during the first three cycles. Both the percentages continuing the first three cycles and those continuing for longer intervals are found to be substantially lower in the slum than in the urban area, at all age groups.

An interesting feature of the figures for the rural area is the strikingly high cumulative continuation rate of women aged 30-34. The percentage continuing the first three cycles comes to 95.5 in this age group whereas it varies between 81 and 85 in other age groups. The divergence becomes even wider after longer intervals: the percentage of rural women aged 30-34 continuing 12 cycles is 87.5 compared to 66.6 for all rural acceptors.

BY NUMBER OF LIVING CHILDREN

The cumulative continuation rates for acceptors by number of living children are presented in Table 7. In all three areas,

TABLE 4. Number of acceptors per 100 eligible women by specified characteristics, for three areas, November 1968-June 1970.

Characteristic	Urban	Slum	Rural
Religion			
Hindu	42.7	51.5	24.4
Muslim	0	14.7	24.5
Literacy			
Illiterate	73.0	21.6	28.8
Literate	33.2	53.9	17.9
Age (years)			
Under 20	52.4	23.0	10.6
20-24	63.8	37.3	19.5
25-34	40.7	33.5	30.5
35 and older	24.5	27.0	25.9
Number of living children			
0-1	24.6	13.2	6.3
2-3	51.7	30.2	21.3
4-5	52.6	41.1	29.1
6 or more	45.9	77.4	40.7
Total	42.7	31.8	24.4
Number of women	1,429	1,488	1,304

TABLE 5: Cumulative continuation rate and dropout rate (percent per cycle) of first children for three areas.

Cycle	Cumulative continuation rate			Interval (cycles)	Dropout rates ^a		
	Urban	Slum	Rural		Urban	Slum	Rural
3	79.0	55.9	85.5	0-3	7.0	14.7	4.8
6	70.5	42.3	76.4	3-6	3.6	8.1	3.5
9	65.3	34.8	69.1	6-9	2.2	4.6	2.1
12	61.1	30.6	66.6	9-12	2.0	2.4	2.6
15	57.5	28.4	61.3	12-15	1.6		0.6
18	54.8	(*)	60.2	15-18	1.7		1.6
21	53.4		(60.2)				
Number of women	609	469	318				

(*) Number of women at risk is under 10.

() Number of women at risk is under 20.

^a The dropout rate for a specified interval was taken as the percentage decrease in the cumulative continuation rate over the interval divided by the number of cycles.

TABLE 6. Cumulative continuation rates (percent per cycle) of first acceptors of orals, by age, for three areas.

Cycle and area	Age									
	<20	N	20-24	N	25-29	N	30-34	N	35+	N
6 Cycle Rates										
Urban	71.9	54	62.6	185	79.4	171	73.5	120	64.3	79
Slum	(*)		30.8	107	57.2	117	41.1	108	42.9	103
Rural	83.3	19	74.0	50	66.7	94	91.8	69	74.4	86
12 Cycle Rates										
Urban	(52.1)		56.3		73.1		67.4		50.1	
Slum	—		(*)		(*)		(31.1)		(30.8)	
Rural	—		(62.9)		54.5		87.5		64.5	

(*) Number of women at risk is under 10.

() Number of women at risk is under 20.

TABLE 7. Cumulative continuation rates of first acceptors by number of living children for three areas.

Cycle and area	Number of living children					
	0,1	2	3	4	5	>5
Cycle 6						
Urban	63.9	66.8	70.2	80.3	77.2	68.5
Slum	<25	(50.9)	41.1	57.1	(51.9)	44.9
Rural	(80.6)	73.2	80.1	73.3	79.1	75.3
Cycle 12						
Urban	46.6	60.9	63.9	72.5	69.4	56.1
Slum	—	—	—	(*)	—	(35.6)
Rural	—	(66.1)	(66.4)	(59.4)	(76.0)	65.4

(*) Number of women at risk is under 10.

() Number of women at risk is under 20.

TABLE 8. Cumulative continuation rate (percent per cycle) of first acceptors of orals by literacy for three areas.

Area and cycle	Cumulative continuation rate	
	Illiterate	Literate
Urban		
3	75.3	81.4
6	67.3	72.8
12	58.3	63.1
18	51.9	56.7
Number of women	249	360
Slum		
3	48.0	62.8
6	32.1	51.3
12	(18.8)	40.8
Number of women	220	254
Rural		
3	83.6	90.1
6	73.7	83.0
12	65.6	69.5
18	59.3	62.9
Number of women	224	94

() Number of women at risk is under 20.

the percentage continuing for a specified number of cycles rises initially and then declines with progressive increase in the number of children.

The percentages, however, vary over a progressively wider range with increase in the number of cycles. Women with one child or none show a particularly rapid decline in continuation, with the percentage continuing at least 12 cycles being 46.6 for these women as compared to 72.5 for women with four children. The percentage for women with six or more children, on the other hand, tends to decline more sharply than for those with five children after later cycles.

Women with a small number of children may adopt a contraceptive method for spacing their children or, if they adopt it for family limitation, they may later decide they want additional children. In either case they are likely to use contraceptives for a limited period. Moreover, women with small families may not feel as compelled to practice family planning as those with large families and may not, therefore, be as conscientious in use of contraceptives. The continuation rate is likely to become progressively higher among women with larger numbers of children and, since older women have more children, also with advancing age. It may be noted in this connection that 48 percent of the women with six or more children were 35 years and older and 16

percent were 40 and older. At ages approaching the end of the fertile period when the family size is completed or nearly so, the expectation of additional children even without contraception will gradually diminish and this is likely to offset the tendency for the continuation rate to increase with larger numbers of children and may explain the consistently high dropout rates for women aged 35 and over and for those having six or more children.

BY LITERACY

The cumulative continuation rates were calculated for literates and illiterates (Table 8). The rate is substantially higher for literates only in the slum area, although the urban and rural rates for literates are also slightly higher than those for illiterates. The dropout rates appear to be higher in the slum area than in the urban or rural for both literates and illiterates but it is the figures for the illiterates that show larger variations.

BY VISITS BEFORE ACCEPTANCE

A majority of the women who started use of the pill in the slum area came to the clinic only after the field workers contacted them for the second or third time at home. Most urban and rural acceptors came to the clinic after one contact or none. The continuation rates of acceptors by number of contacts are, therefore, presented here only for the slum clinic. (The cumulative continuation rates are expressed as percent per cycle.)

Cycle	Cumulative continuation rate Number of visits	
	0-1	2-3
3	50.1	60.3
6	36.4	47.5
12	26.1	(36.0)
Number of women	211	263

() Number of women at risk is under 20.

The cumulative continuation rates of women who came only after repeated visits by field workers and thus needed greater persuasion were consistently higher than the corresponding rates of those who accepted after one visit. At 12 cycles, the continuation rate for the former group was 36.0 compared to 26.0 for the latter. Also, the dropout rates for women who came after at least two contacts were lower during early and later cycles.

TABLE 9. Cumulative continuation rates of reacceptors of orals for three areas.

Cycle	Urban	Slum	Rural
3	54.6	44.9	62.9
6	43.8	36.1	39.4
9	35.8	(36.1)	(*)
12	(29.8)	(*)	(*)
Number of women	149	146	77

(*) Number of women at risk is under 10.

() Number of women at risk is under 20.

TABLE 10. Cumulative continuation rate (percent per cycle) for three areas all segments combined.

Cycle	Cumulative continuation rate		
	Urban	Slum	Rural
3	92.8	73.6	97.9
6	88.8	63.0	95.7
9	84.5	56.1	90.4
12	77.6	47.4	87.7
15	72.1	38.5	86.2
18	66.7	(33.3)	85.1
21	63.6	(*)	(85.1)

a Computation was based on Christopher Tietze, "Intra-Uterine Contraception: Recommended Procedures for Data Analysis," *Studies in Family Planning*, 18S: pp. 1-6, April 1967.

(*) Number of women at risk is under 10.

() Number of women at risk is under 20.

RATES OF REACCEPTORS

The analysis thus far has been confined to experience from the initiation of use of pills until the first discontinuation. Some of the women who discontinued the pill later resumed use. The field workers made as many as three visits to the homes of discontinuers during consecutive cycles to persuade them to come to the clinic on appointed dates. The continuation rates presented in Table 9 relate to the experience from resumption of use after the first interruption until the next discontinuation or the cutoff date for continuers.

The most noteworthy features of these figures are the low cumulative continuation rates in all three areas, and the much smaller differential than in the case of the first segment.

RATES FOR ALL SEGMENTS

Table 10 presents data for all segments combined, the final termination being the cutoff date for the study or the date of discontinuance.

The percentages continuing for a specified number of cycles are appreciably higher in all the three areas than those presented earlier in Table 2 for the first segment (see Table 11). The slum area continues to have substantially lower percentages while differences between the urban and rural areas become progressively marked with

TABLE 11. Percentage increase in cumulative continuation rates for all segments combined over those for the first segment, for three areas.

Cycle	Percentage increase in the cumulative continuation rate		
	Urban	Slum	Rural
3	17.5	31.7	14.5
6	25.9	48.9	25.3
9	29.0	61.2	30.8
12	27.0	54.9	31.7
15	25.4	35.6	40.6
18	21.7		41.4
21	19.1		

longer intervals. The percentage continuing 18 cycles comes to 66.7 in the urban area compared to 85.1 in the rural, the corresponding figures for the first segment being 54.8 and 60.2 respectively in the urban and rural areas.

COMPLAINTS AND DROPOUT

Very few women dropped out because of side effects, but many reported side effects. Almost one-fourth of the acceptors complained of adverse reactions after the first cycle of use of orals (Table 12). The proportion was comparatively smaller in the urban area, 18.6 percent, the slum and rural percentages being 27.1 and 29.2 respectively. After continued use, the proportion of experiencing side effects relative to the number of users dropped to a low level in the urban area, but in the slum and rural areas, although there was a marked reduction during cycles 2-6, there was no significant trend thereafter. Percents of those experiencing side effects by specified type of side effect are shown in Table 13.

The intensity of discomfort that may lead one to report side effects varies among individuals and the large difference between proportions complaining in the urban clinic on the one hand and the slum and rural clinics on the other may be attributed, at least partly, to differences in personal reactions in different environments. Actually, the side effects could not, in most cases, be severe as only 11 women in the urban, 17 in the slum, and 2 in the rural area discontinued the pills because of side effects (Table 14). Also nausea and vomiting, a major complaint after the first cycle of use in all the three clinics, and breast discomfort in the slum area were reported by only a few after continued use. By comparison, headaches, dizziness, and break-through bleeding continued to be reported, although by relatively fewer women, in later cycles. The few women who reported leg pain were not found

TABLE 12. Number of oral acceptors and percent complaining of side effects for three areas.

Cycle	Urban		Slum		Rural	
	Number of acceptors	Percent complaining	Number of acceptors	Percent complaining	Number of acceptors	Percent complaining
1	609	18.6	469	27.1	318	29.2
2-6	437	3.4	212	14.3	239	13.2
7-12	262	2.5	72	12.7	134	13.0
13-18	134	2.2	20	14.9	67	8.7

TABLE 13. Oral acceptors by type of side effect, for three areas.

Area and cycle	Number of acceptors per cycle	Head-ache and dizziness	Percent with specified type of side effects						
			Break-through bleeding	Nausea and vomiting	Breast discomfort	Abdominal pain	Leg pain	Allergic reaction	Anxiety
Urban ^b									
1	609	46.0	33.0	58.0	—	6.0	4.0	—	—
2-6	437	4.0	8.4	2.2	—	2.8	1.6	0.6	—
7-12	262	1.2	5.8	0.3	—	1.7	0.3	0.2	—
13-18	134	1.5	2.3	0.3	—	0.5	0.5	—	—
Slum ^b									
1	469	50.0	35.0	41.0	10.0	28.0	9.0	1.0	6.0
2-6	212	12.2	8.0	2.0	1.4	9.4	3.0	—	0.6
7-12	72	3.7	2.8	0.5	0.2	2.5	0.7	—	0.5
13-18	20	0.8	1.2	0.2	0.2	0.8	—	—	—
Rural ^b									
1	318	40.0	37.0	31.0	1.0	—	1.0	2.0	3.0
2-6	239	10.4	20.2	4.0	—	0.4	1.2	1.2	—
7-12	134	5.3	12.7	0.8	0.3	0.8	0.2	0.5	—
13-18	67	3.3	4.0	—	—	0.3	0.2	0.3	—

^a Percents sum to more than 100 because some respondents reported more than one side effect.

^b There was also one case of pigmentation in the sixth cycle in the urban area and one such case in the third as well as in the fifth cycle in the rural area.

TABLE 14. Number discontinuing the oral by reason for discontinuation, for three areas.

Reason	Urban	Slum	Rural
Side effects	11	17	2
Other problems of use	9	135	11
Husband's objection	4	7	6
Physician's advice	4	22	1
Adverse publicity	—	—	2
Religious reasons	—	—	2
Lack of confidence in drug	1	—	—
Switched to another method	—	106	—
Other reasons	35	9	13
Not needing contraception	8 ^a	3 ^b	—
Desire for a child	10	4	6
Unplanned pregnancy:			
Using pills irregularly	8	2	3
After discontinuation	1	—	3
Others	8	—	1
Reasons unknown	8	4	—
Total	63	165	26
Lost to follow-up	30	21	—

^a Vasectomy-4; tubal ligation-2; separation or death of husband-1; husband sick or away-1.

^b Vasectomy-1; separation or death of husband-2.

after examination by physicians to have distinctive symptoms of thromboembolic disease.

The reasons for discontinuation presented in Table 14 were ascertained only when the women did not resume use of the pills even after repeated visits by field workers. Out of 11 women in the urban

area and 17 in the slum who dropped out because of side effects, eight did so in each case during the first two cycles.

In the urban area, nine women discontinued because of other problems of use, mostly husband's objection or "physician's advice." It was found that in all the three areas, when the women cited

physician's advice, the physicians concerned were not qualified medical practitioners.

In the slum area out of a total of 165 women who discontinued the pills, 106 had switched to the condom for reasons not clearly stated. It was noted earlier that the continuation rate in the slum area was much lower than in the urban and rural. It appears that in a large majority of cases of final discontinuation in the slum area, the women had been under some influence to substitute the condom for the pill. Condoms are distributed free by local medical practitioners and have been available since mid-1969. The physician's advice had also a greater impact on discontinuation in the slum area than in the urban and rural: 22 women discontinued the pills for this reason in the

slum area as compared to four in the urban and one in the rural area.

The other specified causes, not related to problems of use, account for a much larger number of cases of discontinuation in the urban area than in the slum or rural. Generally they fell into three categories: first, women who did not need contraception because they or their husbands had been sterilized or because their husbands were not present; second, women who desired additional children; and third, those who had unplanned pregnancies during irregular use of pills. (One urban and three rural women reported unplanned pregnancies during follow-up home visits after they had already discontinued the pills.) In addition eight women in the urban and one in the rural area who reported they were pregnant only after

using the pills for some time were suspected to have concealed the fact of their pregnancy prior to acceptance of the pills, having imagined that these could be used as abortifacients.

Conclusion

The question that is of primary importance in this study is whether Indian women, particularly those who are in the rural areas and are illiterate, will accept the pill and whether they will continue using the pill over a period of time. The data show that oral pills can be an acceptable method of contraception for Indian women. The high continuation rate in the urban and rural areas is also an important finding in its favor.



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